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TIJUANA RIVER FLOOD CONTROL PROJECT SAN DIEGO COUNTY
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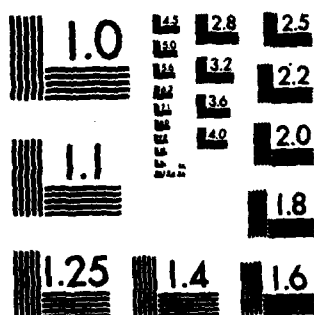
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FINAL ENVIRONMENTAL STATEMENT

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**TIJUANA RIVER
FLOOD CONTROL PROJECT
SAN DIEGO COUNTY, CALIFORNIA**

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This environmental statement, covering a flood control project in the Tijuana River basin, San Diego County, California, was pre- pared in compliance with Public Law 91-190, National Environmental Policy Act of 1969. It presents detailed information on the environmental setting, the environmental impact of the proposed action and an evaluation of various plans for the Tijuana River flood control project.		

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
UNITED STATES SECTION

FINAL ENVIRONMENTAL STATEMENT
TIJUANA RIVER FLOOD CONTROL PROJECT
San Diego County, California

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May 1976

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**TIJUANA RIVER FLOOD CONTROL PROJECT
SAN DIEGO COUNTY, CALIFORNIA**

FINAL ENVIRONMENTAL STATEMENT

Prepared by:

**U.S. Army Engineer District
Los Angeles, California**

May 20, 1976

Prepared for:

**United States Section
International Boundary and Water Commission
El Paso, Texas 79908**

FINAL ENVIRONMENTAL STATEMENT
TIJUANA RIVER FLOOD CONTROL PROJECT
SAN DIEGO COUNTY, CALIFORNIA

ERRATA

Summary, para. 2, line 7	Insert comma following "Tijuana River valley"
Summary, para. 6, line 7	Revise date to 7 June 1976
Pg. 6, para. 2.05, line 7	Delete sentence, "Although some as the San Jacinto.", and insert "Although some of the local faults are considered active or potentially active, they would not be capable of producing sufficient force to be able to generate a major earthquake. The most likely source for a major earthquake would be on one of the larger faults that have considerable length such as the San Jacinto."
Pg. 6, para. 2.06, line 14	Delete extra "1" in "following"
Pg. 6, para. 2.07, line 6	Correct "capacity"
Pg. 7, para. 2.08, line 7	Correct to "averaged 453 acre-feet"
Pg. 8, para. 2.15, line 8	Correct to "recharged the ground water"
Pg. 10, para. 2.24, line 3	Correct to "covers an <u>area</u> of"
Pg. 11, 2d line from top	Insert "California" following "one of the finest in southern..."
Pg. 11, para. 2.27, line 10	Correct last word to "regularly"
Pg. 12, 11th line from top	Correct to "double-crested cormorant"
Pg. 14, para. 2.38, line 7	Delete extra "S" in SPF
Pg. 17, para. 2.50, line 1	Correct to "has discharged untreated sewage"
Pg. 18, para. 2.56, line 3	Delete the word "south" following "Border Field"
Pg. 19, para. 2.59, line 4	Correct to "Serra"
Pg. 19, para. 2.59, line 7	Correct "Gulch"
Pg. 19, para. 2.60, line 2	Correct "resources"
Pg. 20, para. 2.63, line 4	Correct next to last word to "enhance"
Pg. 20, para. 2.65, line 7	Correct first word to "is"
Pg. 22, para. 3.02, line 2	Correct to read "CPO is <u>an</u> advisory..."
Pg. 24, para. 4.05, line 12	Correct to read "The 283-acre sediment..."
Pg. 25, para. 4.10, line 6	Delete extra "will" at start of line
Pg. 26, para. 4.14, line 2	Correct "sediment"
Pg. 26, para. 4.15, line 6	Insert comma following "when available"
Pg. 29, para. 4.26, line 2	Correct "obviously"
Pg. 29, para. 4.27, line 1	Delete comma following "Impacts on air..."
Pg. 33, para. 6.08, line 16	Correct "mammals" and change "inhabitat" to "inhabit"
Pg. 34, para. 6.10, line 7	Delete "the" in the phrase "...because of its high costs"
Pg. 35, para. 6.19, line 5	Insert comma following "... divide the valley"
Pg. 39, para. 6.35, line 9	Correct 4th word to "about"
Pg. 39, para. 6.35, line 14	Correct 8th word to "other"
Pg. 41, para. 9.03, line 6	Correct 3rd from last word to "outweighed"
Pg. 43, last para., line 8	Correct to "...500 acre feet (ref. 20..."
Pg. 49, subpara. d, line 5	Correct " <u>sanctuary</u> "
of "Comment"	
Pg. 53, "Comment" at top of page, last line thereof	Delete quotation mark at end of line

ERRATA

Pg. 56, "Response" at top of page, penultimate line	Correct to read "...streams at the projects_.."
Pg. 56, "Comment" in mid-page, line 7	Correct "stagnant"
Pg. 61, subpara. d, line 1	Correct "submitted"
Pg. 68, last "Response" on page, line 3	Correct "significantly"

FOREWARD

Although many reports and maps of various agencies of the United States Government refer to the Tia Juana River in California and Mexico, the 1944 water treaty between the United States and Mexico refers to that river as the Tijuana River. (See ch. 4, Executive A, U.S. Senate, 78th Cong., 2d sess.) Because the treaty spells the river name Tijuana and the proposed plan is an integral part of an international project, this report will hereafter refer to the river as the Tijuana River.

The wetland area at the mouth of the Tijuana River has been variously called an estuary, slough or lagoon depending on the reference cited. This report herein refers to the Tijuana Estuary in accordance with the terminology used by the California Department of Fish and Game, U.S. Fish and Wildlife Service, and California Coastal Zone Conservation Commission.

SUMMARY

TIJUANA RIVER FLOOD CONTROL PROJECT San Diego County, California

Draft ☒ Final Environmental Statement

RESPONSIBLE OFFICE: United States Section, International Boundary and Water Commission, 4110 Rio Bravo, El Paso, Texas 79902

1. NAME OF ACTION: ☒ Administrative ☐ Legislative

2. DESCRIPTION OF ACTION: The proposed plan involves the construction of (a) 1,400 feet of concrete-lined trapezoidal channel; (b) a 3,650-foot-long energy dissipator; and (c) about 9,100 feet (1.7 miles) of levees. These three structures would be within the United States near the international boundary; the channel would be an extension of the 2.7-mile-long concrete channel constructed in Mexico. The proposed plan was selected by the San Diego City Council from alternatives it considered as being in keeping with its land-use concepts for the Tijuana River valley and fulfills our international commitment to Mexico.

3a. ENVIRONMENTAL IMPACTS: The proposed plan will result in the least impact on the Tijuana River valley of all the structural alternatives considered, and allows the City of San Diego to pursue their open space land-use concepts. Flood protection to a limited area in the United States including portions of San Ysidro; preservation of the status quo water supply condition in the flood plain; continuation of estuarine areas under present conditions; prevention of backwash flooding to lands in Mexico; preservation of open spaces; retention of the beneficial effects derived from periodic flooding of the flood plain, including flushing of salts from surface soils, fertilization of the land by deposition, and recharge of ground water; encouragement of urbanization on flood protected areas; and probable use for agricultural, open space, natural preserve and recreational purposes of most of the flood plain which is not afforded flood protection.

3b. ADVERSE ENVIRONMENTAL EFFECTS: Permanent loss, disturbance, or alteration of riparian and flood plain vegetation and limited wildlife habitat in the immediate project area; short-term air, water, land, and noise pollution during project construction; encouragement of urbanization in the flood protected areas, resulting in limited reduction in open space, natural vegetation, and wildlife habitat; and alteration of the natural landscape in the project area.

4. ALTERNATIVES: The alternatives to the proposed plan include:

a. Full Channelization, with seven plan variations

(1) Plan A, the original authorized plan, which proposes a 230-foot-wide concrete channel aligned south of the existing river channel extending 3.9 miles and widening to 310 feet for the remaining 1.4 miles to the ocean;

(2) Plan A-1, which proposes a 230-foot-wide concrete channel, alined south of the existing river channel, transitioning to an earth-bottom channel and extending to the ocean;

(3) Plan B, which proposes a 230-foot-wide concrete channel alined along the northern edge of Border State Park extending for 3.9 miles and widening to 310 feet for the remaining 1.4 mile to the ocean;

(4) Plan C, which proposes a 230-foot-wide concrete channel, alined along the existing river channel and extending to the ocean;

(5) Plan D, which proposes a 230-foot-wide earth-bottom channel transitioning through an energy dissipator into a 700-foot-wide earth-bottom channel alined along the existing river channel and extending to the ocean;

(6) Plan E, which proposes an earth-bottom channel 1,440 feet wide with drop structures and revetted side slopes alined along the existing river channel and extending to the ocean; and

(7) Plan H, which proposes a 230-foot-wide concrete channel alined south of the existing channel, transitioning to an earth-bottom channel at 19th Street and extending to the ocean;

b. Partial Channelization (Plan F), which proposes a 230-foot-wide concrete channel alined along the existing river channel and terminating 2 miles from the ocean;

c. The "no action" alternative; and

d. Flood Plain Management.

5. Comments Received: 1974 Draft Environmental Statement

FEDERAL AGENCIES

Advisory Council on Historic Preservation
Office of Economic Opportunity
U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Health, Education and Welfare
U.S. Department of Interior, Pacific Southwest Region
U.S. Environmental Protection Agency
U.S. Navy, Eleventh Naval District
U.S. Department of Transportation:
Eleventh Coast Guard District (MEPPS)
Federal Highway Administration

STATE AND LOCAL AGENCIES

The Resources Agency of California
San Diego County Comprehensive Planning Organization
City of San Diego

CITIZEN GROUPS

San Diego County Floodplain Technical Committee

OTHERS

Cramer Corporation
Pacific Legal Foundation
Pomona College, Dept. of Zoology

1976 Public Meeting

Federal Agencies

Government Services Agency
U.S. Fish and Wildlife Service

State Agencies

California Department of Parks and Recreation

Citizens Groups

Border Area Citizens for De-Annexation
Citizens Coordinate for Century 3
Concerned Younger Citizens of Imperial Beach
Congressman VanDeerlin
Imperial Beach, Mayor
National City, Mayor
San Diego Audubon Society
San Diego Chapter, Sierra Club
San Diego Flood Plain Technical Committee
San Diego Field Ornithologists
San Ysidro Chamber of Commerce
San Ysidro Property Owners
South Bay District Chamber of Commerce
South Bay Economic Council
Tijuana Valley County Water District
Zero Population Growth

Individuals

Helix Corporation

Nelson and Sloan

**Residents of Chula Vista, Imperial Beach, La Mesa,
National City, Nestor, San Ysidro, and San Diego**

6. Draft Statement to CEQ 23 April 1974

Final Statement to CEQ 2 June 1976

SUMMARY OF ECONOMIC DATA

Supporting Information is Available at

U.S. Army Engineer District
300 N. Los Angeles Street,
Los Angeles, California 90053

A. First Costs:	
Construction (incl. eng. and admin. costs)	\$10,800,000
Rights-of-way	3,600,000
Road Relocation	110,000
Sewage Diversion	90,000
Total	14,600,000
B. Annual Charges 100 years, 6-1/8 percent	
First Cost	896,000
Operation and Maintenance	45,000
Total	941,000
C. Annual Benefits: 100 years, 6-1/8 percent	
Flood Damage Reduction	176,000
Increased Land Utilization	270,000
Total	446,000

The proposed project will have additional important benefits of: (a) meeting our international commitment to Mexico by allowing Mexico to complete its channel project and prevent backwater flooding into the City of Tijuana; (b) the San Ysidro area realizing housing, employment, and economic gains; and (c) allowing the City of San Diego to implement management of its portion of the lower Tijuana River valley in accordance with its proposed land-use plan.

FINAL ENVIRONMENTAL STATEMENT
TIJUANA RIVER FLOOD CONTROL PROJECT
SAN DIEGO COUNTY, CALIFORNIA

TABLE OF CONTENTS

	Page
PROJECT DESCRIPTION	1
Location	1
Authorization	1
Original plan	2
Proposed plan	3
Operation and maintenance	4
Project cost	4
International and social considerations	4
ENVIRONMENTAL SETTING WITHOUT THE PROJECT	5
Climate	5
Geology and soils	5
Faults	5
Seismicity	6
Hydrology	6
Ground water	7
Vegetation and wildlife	8
Tijuana Estuary	10
Threatened species	11
Vector production and diseases	12
Land uses	12
Population and economy	14
Transportation	15
Development in Tijuana	15
Water and solid waste pollution	15
Air quality	17
Recreation	18
Historical, archeological, and cultural features	19
Future environmental setting without the project	19
Other Federal projects in the area	21
RELATIONSHIP OF THE PROPOSED ACTION TO LAND-USE PLANS	21
THE PROBABLE IMPACT OF THE PROPOSED ACTION ON	
THE ENVIRONMENT	23
International relations	23
Flood protection	23
Land use	24
Land-use planning	25
Vegetation and wildlife	25

CONTENTS – Continued

	Page
Sedimentation	26
Vector production and diseases	27
Open space	27
Estuary	28
Ground water	28
Recreation	29
Esthetics	29
Pollution	29
Impact on the economy	30
ANY PROBABLE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED	30
Mitigation	31
ALTERNATIVES TO THE PROPOSED ACTION	31
Full Channelization Alternative	33
Plan A	33
Plan A-1	34
Plan B	34
Plan C	35
Plan D	35
Plan E	36
Plan H	36
Partial Channelization Alternative – Plan F	37
No Action	38
Flood plain management	38
Flood insurance	38
Comparison of alternatives	39
THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY	39
Flood protection	39
Open space	40
Agriculture	40
Pollution	40
Estuary	40
ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED	40
COORDINATION	40
1971 Draft Environmental Statement	41
1974 Draft Environmental Statement	41
Citizen groups and individuals	54
Public participation	70
Public meeting	70
REFERENCES	72

APPENDIX Letters of Comment

Contents - Continued

PHOTOS

No.	Subject
1.	View of the lower Tijuana River valley study area
2.	Flood control channel constructed in Mexico
3.	Some vegetation in the proposed project area
4.	Riparian vegetation along the Tijuana River near Dairy Mart Road
5.	The Tijuana River channel and estuary
6.	Agricultural land uses predominate in the lower Tijuana River valley
7.	Litter and debris from Mexico carried into the United States by the Tijuana River

TABLES

No.	Title
1.	Annual runoff in the lower Tijuana River valley 1937-1975
2.	Water table fluctuations in selected wells in the lower Tijuana River valley
3.	Vegetation in the riparian habitat along or within the Tijuana River channel
4.	Partial list of birds observed near the Tijuana River channel
5.	Animals which inhabit or visit the lower Tijuana River valley
6.	Vegetation in the Tijuana River salt marsh and estuary
7.	Partial list of birds frequenting the Tijuana River salt marsh and estuary
8.	Fishes and cephalochordates inhabiting the Tijuana River estuary
9.	Invertebrates in the tidal channels and adjacent intertidal areas of the Tijuana River estuary
10.	Unique, rare, or endangered plants and animals of the lower Tijuana River valley and estuary

Contents - Continued

PLATES

No.	Title
1.	Project Location
2.	Proposed Plan - Leveed Energy Dissipator
3.	Tia Juana River Valley Plan - City of San Diego
4.	Full Channelization Alternative - Plan A
5.	Full Channelization Alternative - Plan A-1
6.	Full Channelization Alternative - Plan B
7.	Full Channelization Alternative - Plan C
8.	Full Channelization Alternative - Plan D
9.	Full Channelization Alternative - Plan E
10.	Full Channelization Alternative - Plan H
11.	Partial Channelization Alternative - Plan F

**FINAL ENVIRONMENTAL STATEMENT
TIJUANA RIVER FLOOD CONTROL PROJECT
SAN DIEGO COUNTY, CALIFORNIA**

1. PROJECT DESCRIPTION

1.01 This environmental statement, covering a flood control project in the Tijuana River basin, San Diego County, California, was prepared in compliance with Public Law 91-190, National Environmental Policy Act of 1969. It presents detailed information on the environmental setting, the environmental impact of the proposed action and an evaluation of various plans for the Tijuana River flood control project.

1.02 LOCATION. The Tijuana River is an ephemeral stream draining an area of about 1,700 square miles within Mexico and the United States. The fan-shaped drainage area is about 75 miles long and 50 miles wide (see pl. 1). The river originates at the confluence of Cottonwood Creek (Arroyo del Alamar) and the Rio de las Palmas about 11 miles southeast of the City of Tijuana, Baja California, Mexico. It flows northwestward through the City of Tijuana, and crosses the international boundary into California. The river then continues westward about 5.3 miles and empties into the Pacific Ocean about 1.5 miles north of the international boundary (pl. 1).

1.03 The lower Tijuana River valley (the California part of the Tijuana River valley) considered in this report is located mostly within the city limits of San Diego and about 14 miles south of downtown San Diego. This study area contains about 4,800 acres that are subject to flooding by the largest flood that can reasonably be expected in the area. The area is a westward sloping coastal flood plain about 5.3 miles long and generally 1.5 miles wide (photo 1). The lower valley is bounded on the south and northeast by steep slopes and terraces 300 to 500 feet high; on the north by 20- to 50-foot-high terraces; on the east by the community of San Ysidro; and on the west by the Pacific Ocean. A 0.4 to 0.8-mile-wide coastal strip almost 3 miles long adjacent to the ocean is within the City of Imperial Beach. A diagrammatic cross section of the valley floor is shown on plate 1, section A. The western part of the valley contains a 1,100-acre estuary with an extensive area occupied by salt marshes and tidal channels. The estuary, which is about 3 miles long and about 1.5 miles wide, is almost completely separated from the ocean by a broad sandy beach and a narrow zone of low sand dunes.

1.04 AUTHORIZATION. Public Law 89-640, October 10, 1966, authorized the United States Section, International Boundary and Water Commission (IBWC), to conclude an agreement with the government of Mexico for an international flood control project in the Tijuana River. The project, which was to be constructed, operated, and maintained by the United States and Mexico jointly, was to be located and have characteristics substantially as described in the "Report, Proposed International Flood Control Project, United States and Mexico, Tijuana River Basin" dated July 1965. The project report, which was prepared by the IBWC, contains a supporting report by the Corps of Engineers, Los Angeles District. International agreements covering the international flood control project are contained in Minutes No. 225 (June 19, 1967) and No. 236 (July 2, 1970) of the International Boundary and Water Commission, with both Governments approving these Minutes.

1.05 The IBWC requested that the Los Angeles District, Corps of Engineers conduct engineering, economic and environmental studies for the flood control project. Since the Tijuana River flood plain in the United States is located largely within San Diego City limits (see pl. 1 for study area location), the IBWC and Corps of Engineers closely coordinated development of a flood control plan with the City of San Diego. The San Diego City Council, by Resolutions in 1964, 1965, and 1971 provided local assurances for the United States portion of the authorized plan. Development of the original project for the authorized plan was in accordance with the City's Border Area Plan, adopted November 9, 1967, which covered the lower Tijuana River Basin and adjacent area.

1.06 ORIGINAL PLAN. The original plan for the authorized project provided for the following: (a) about 5.3 miles of concrete-lined trapezoidal channel between the international boundary and the Pacific Ocean, providing a United States extension of the 2.7-mile-long concrete-lined channel currently nearing completion in Mexico; (b) facilities to divert a maximum flow of 30 cfs (cubic feet per second) to a spreading basin for ground water recharge; (c) facilities to collect and channelize the major side drainage into the main channel; (d) inlets for minor side inflows; and (e) stone jetties at the seaward end of the project. The trapezoidal channel would have had a base width of 230 feet for the segment extending 3.9 miles westward from the international border and a base width of 310 feet for the remaining 1.4 miles. The overall width of the channel would have varied but would not have exceeded 670 feet. The channel structure would have occupied 310 acres, and the planned spreading basin would have required an additional 120 acres of the present riverbed and flood plain land. Levee heights would have ranged from 20 to 27.5 feet to control an internationally-agreed-upon design flood of 135,000 cfs.

1.07 A draft environmental statement, submitted in compliance with Public Law 91-190, covering the original flood control plan was sent out for formal coordination with Federal and State agencies and local groups on April 12, 1971. Various beneficial and adverse environmental impacts of the proposed plan, especially those relating to the Tijuana Estuary, were pointed out by the responding agencies and groups. By resolution, the City Council of San Diego on December 21, 1971 suspended support of the channel project because of economic considerations, environmental concerns, and a desire to reconsider future land uses contemplated in their Border Area Plan. The City Council directed its staff to review and update the Border Area Plan and requested the IBWC and the Corps of Engineers to reconsider the plan and to analyze feasible alternatives.

1.08 In accordance with the City of San Diego's request for study of alternative plans, the IBWC and the Corps of Engineers proceeded to analyze various flood control alternatives that would satisfy the new planning objectives of the City of San Diego. The City Council adopted by Resolution on October 31, 1972 a preliminary planning concept prepared by its staff as a basis for proceeding with further feasibility investigations. The City of San Diego then hired consultants to study ground water problems and agricultural potential of the lower Tijuana River valley for use in the preparation of a city report on various land-use alternatives and related flood control facilities for the Tijuana River valley. The joint report, prepared by the City Manager and the Planning Department and entitled "Tijuana River Valley Land Use and Flood Control Alternatives" (ref. 7) was submitted to the Mayor and City Council on May 18, 1973. Analyses were made of six alternatives that considered a wide range of land uses and associated flood control facilities. That report recommended a plan of minimum flood control facilities that would retain the present land uses of the

Tijuana Estuary and of the agricultural areas in the lower Tijuana River valley. This plan was considered by the San Diego City Council as the best alternative to achieve their long-range city goals and satisfy their economic, planning, engineering, and environmental objectives. The San Diego City Council approved in principle the recommendation of City Plan III-A on August 23, 1973 and passed a resolution on October 30, 1973 selecting this plan. Subsequently, the IBWC directed the Corps of Engineers to prepare the environmental statement of the flood control project as requested by the city.

1.09 PROPOSED PLAN. This environmental statement covers the flood control project as requested by the City of San Diego. It reflects the city's suggested minor modification of the project right levee alignment from that presented in the 1974 draft environmental statement. An Environmental Assessment (ref. 36) of this project modification (a 1,700-foot-long right levee realignment and extension) was coordinated with appropriate agencies and citizens groups. No opposition to this minor project change was expressed. The proposed plan (see pl. 2), provides for the following:

a. Construction of about 1,400 feet of concrete-lined trapezoidal channel with a 230 foot base width, beginning in the United States at the international boundary, as a continuation of the 2.7-mile-long Mexican channel. The channel depth and levee heights will range from about 20.5 to 23 feet, and the side slopes will be 1 vertical to 2 horizontal flattening to 1 vertical to 2.25 horizontal in the transition to the energy dissipator. A view of the proposed project area is shown in the center and upper center of photo 1. Photo 2 shows the constructed Mexican channel.

b. Construction of a 3,650-foot-long energy dissipator with grouted stone and dumped stone, which will reduce peak discharge water velocity of 29 feet per second (fps) to about 12 fps within the dissipator. The velocities between the dissipator and the relocation of Dairy Mart Road, during standard project flood (SPF) conditions, will be reduced to about 3 fps. From the project area downstream to the estuary the velocities under SPF conditions will not be changed from preproject conditions, and with existing topographic difference will range from 3 to 6 fps. The base of the energy dissipator will increase in width from 230 feet to 830 feet in 2,500 feet. Floodwater and sediment will pass through the channel and dissipator to discharge through an area between levees, cross the relocated Dairy Mart Road and flow into the unprotected lower Tijuana River valley nearly 2.2 miles downstream from the boundary. Low flows will be directed from the dissipator through the area between the levees into the existing Tijuana River streambed via an earth-bottom channel with a 50-foot-base width.

c. Construction of 9,100 feet (about 1.7 miles) of levees from excavated material removed from the channel and energy dissipator site. The right levee will extend north and west from the downstream end of the energy dissipator about 6,300 feet to Dairy Mart Road and will protect 400 acres, including part of the community of San Ysidro, from discharged floodwaters. The left levee (south) will extend along the international boundary for about 2,800 feet to a mesa, protecting the City of Tijuana in Mexico from flooding that could occur from the discharged floodwaters. The levees will have a height up to 15 feet, a crest of 16 feet and side slopes of 1 vertical to 2 horizontal.

d. Relocation of Dairy Mart Road, which will form the limit of a 283-acre sediment deposition-velocity reduction area. The sediment deposition area will (1) further reduce the velocities of floodflows leaving the energy dissipator and (2) trap a small portion of flood conveyed sediments. The low-flow channel will function to rapidly drain the sediment deposition area following a flood.

e. An excess of 500,000 cubic yards (noncompacted) of excavated materials which will be disposed of in depressions along the project area and in borrow pits along the Tijuana River channel and flood plain between the project and Interstate 5.

f. A sewage diverter will be incorporated into the low-flow concrete channel near the boundary to intercept and divert into an existing main of the City of San Diego any accidental dry season sewage flows entering the United States from Mexico.

g. A 20-foot-wide vegetative screen of high native plants will be landscaped along the channel face of each levee for: (1) velocity reduction, (2) project beautification, and (3) mitigation of wildlife habitat losses.

h. Rights-of-way fencing around the project area and safety fencing along the concrete channel and energy dissipator.

i. Total rights-of-way of 454 acres, of which 283 acres will be required as a sediment deposition area downstream from the energy dissipator.

1.10 Landscaping features are a part of the proposed plan. A detailed landscaping plan will be prepared and coordinated with the City of San Diego. The landscaping scheme will be designed to blend with the natural landscape and surrounding land uses.

1.11 OPERATION AND MAINTENANCE. The IBWC will be responsible for operation and maintenance of the United States portion of the Tijuana River flood control facilities. Sediments in the deposition area and low-flow earth-bottom channel will be periodically removed to retain the design capacity of the system. When available the spoil material will be provided to local interests as fill for recreation areas they propose constructing, floodproofing of lands, highway construction, or similar uses. Spoil disposal will occur in accordance with all local, State and Federal legal requirements.

1.12 PROJECT COST. The total project cost is estimated at \$14,600,000. Federal costs amount to \$12,320,000 and non-Federal costs to \$2,280,000. Average annual charges, including interest and amortization, operation and maintenance, and loss of land productivity are \$941,000. Average annual benefits are estimated at \$446,000, including flood damages prevented (\$176,000) and increased land utilization (\$270,000). Economic benefits and costs were computed in 1976 dollars, based on an interest rate of 6-1/8 percent computed over a 100-year project life.

1.13 INTERNATIONAL AND SOCIAL CONSIDERATIONS. The project will fulfill our international commitment to Mexico, allow Mexico to complete its channel to the international boundary, and prevent backwater flooding into the City of Tijuana in Mexico while reducing floodwater velocities coming from Mexico's concrete-lined channel to the presently uncontrolled conditions in the natural channel. The project will provide flood

protection to about 400 acres of land in the San Ysidro area; ultimately, San Ysidro residents will realize housing, employment and economic gains. The project will allow the City of San Diego to implement management of their portion of the lower Tijuana River valley for multipurpose land uses—urban development, agriculture, open space, natural preserve, recreation, and estuary preservation.

1.14 Implementation of the proposed plan will require additional action by the Congress and an agreement with Mexico to confirm the Mexican Commissioner's prior advice that the proposed plan is satisfactory to Mexico.

ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.01 CLIMATE. The lower Tijuana River valley has a subtropical steppe climate characterized by hot summers and mild winters. The monthly mean temperature is lowest in January (about 52 degrees F.) and highest in August (about 72 degrees F.). Prevailing winds are from the northeast in winter and the west in summer; velocities in the afternoon range from 5 to 15 miles per hour.

2.02 Precipitation usually results from winter storms. The upper part of the Tijuana River drainage basin averages more than 20 inches of rainfall annually. Near the coast, rainfall averages 9 to 10 inches per year—8.90 inches at Chula Vista and 9.45 inches at San Diego. Nearly 90 percent of the rainfall occurs from November through April with January and February being the wettest months. Rainfall from June through September averages only about 1/4 inch near the coast and about 1 inch in the interior mountains. The amount of precipitation falling on the basin varies considerably from one year to the next. Since 1945, the area has experienced a protracted drought; annual rainfall has substantially exceeded the estimated long term normal over the basin during the rainfall years (July-June) of 1951-1952, 1957-1958, 1965-1966, and 1968-1969, with near or slightly above normal precipitation in only about six or seven seasons out of the 31 years since 1945.

2.03 GEOLOGY AND SOILS. The lower Tijuana River valley is bounded on the north by a terrace composed primarily of Pleistocene sandstones of the San Pedro formation. On the south, the valley is bordered by a terrace consisting of Pliocene sandstones. Alluvial deposits of Quaternary age cover the valley floor; these deposits are composed of unconsolidated sands, gravels, silts, and clays. In some places, these deposits attain a maximum thickness of approximately 130 feet. The valley floor is underlain by marine sedimentary rocks of Tertiary age, described as conglomerates, sandstones, shales, and limestones.

2.04 FAULTS. There are three significant northwest trending faults in the San Diego area. The Rose Canyon fault, thought to be a southern extension of the Newport-Inglewood fault, extends southeasterly through Rose Canyon into the City of San Diego and becomes obscured at the northeast edge of San Diego Bay. Continuing studies are in progress to determine the actual location of the fault between San Diego and the Mexican Border. The La Nacion fault crosses the border at San Ysidro 1/2 mile east of the Tijuana River. The Sweetwater fault, which parallels the La Nacion 1 mile to the west, is obscured below Otay valley, 3 miles north of the Tijuana River. Other major northwest-trending faults that have a greater potential for the possible occurrence of a large earthquake include the Elsinore,

Agua Caliente, San Jacinto, and the San Andreas. These are located to the northeast 50 miles, 67 miles, 70 miles, and 100 miles, respectively. The San Clemente fault is about 70 miles offshore.

2.05 SEISMICITY. A study was recently completed by the Los Angeles District, Corps of Engineers, on the seismicity of the lower Sweetwater Valley, located approximately 8 miles north of the Tijuana River. This study indicated that approximately 40 earthquakes of magnitude 4.0 or greater have occurred within a 35 mile radius of lower Sweetwater River Valley during the last 40 years. Thirty-four of these events have a recorded magnitude of 4.0 to 4.9 and six have a recorded magnitude of 5.0 to 5.7. Twelve earthquakes of magnitude 3.0 to 3.9 have occurred within a 12 mile radius of downtown San Diego. Although some of the local faults are considered active or potentially active they would not be on one of the larger faults that have considerable length such as the San Jacinto. It is considered that an earthquake could occur on this fault system with a Richter magnitude of 7+. An earthquake of this magnitude located at least 60 miles from the project would not produce strong enough ground motion at the site to cause more than slight damage.

2.06 The alluvial soils on the valley floor range from sands and gravels in the eastern part to silts and clays near the estuary. Thick surface layers of mud cover the inland part of the estuary. The deep, fertile soils covering the flood plain belong to the Yolo and Dublin soil series and are composed mostly of sands, silts, or sandy loams. The soils of the Tijuana River valley consist mostly of Tujunga sand, Chino silty loam and Visalia sandy loam. The large expanse of Chino silty loam is considered high in inherent fertility (ref. 33). The valley floor maintains a high water-bearing capacity because of its high porosity and its high degree of permeability. The flood plain in the lower Tijuana River valley is covered with rich fertile soil, which under proper conditions would be ideal for growing vegetables and other crops. The soils of the valley are marginal on the sandy river bottom, but they are excellent in the silty loam flood plain. Despite recurrent water shortages, this flood plain has been cultivated for nearly 100 years. However, a soil salt build-up is rendering the soil unsuitable for growing salt-sensitive crops. Since the 1930's, the salt level in the valley soil has increased, because of the following factors: (a) increased concentration of salts in the ground water used for irrigation; (b) limited recharge of ground water by better quality surface water because water storage dams in the upper, heavier-rainfall watershed have reduced runoff, and the occurrence of a series of dryer-than-normal years which has not yet ended; and (c) the absence of any major floods since 1941 to leach salts from the soil. As a result of these factors, the soil in the valley has deteriorated and farming has been abandoned in most of the western half of the valley. The soil management practices by valley farmers contributes to high nitrate deposits in surface and subsurface soils. These adverse factors have contributed to decreasing crop production throughout the entire valley.

2.07 HYDROLOGY. The Tijuana River drains about 1,700 square miles, 73 percent of which lie in Mexico. Runoff in the watershed is partially stored in three water conservation reservoirs. Morena Dam, completed in 1910, and Barrett Dam, completed in 1921, are located in the United States and supply water for the City of San Diego. Rodriguez Dam, located in Mexico, was completed in 1937 to provide water for irrigation along the Tijuana River and domestic use for the City of Tijuana. These dams, which have a combined capacity of 206,000 acre-feet (Rodriguez reservoir has a 111,000 acre-foot capacity), regulate about 71 percent of the total drainage area. The reservoirs were designed as water conservation facilities and do not have storage capacity for flood control purposes. However, the three

conservation reservoirs control most flows resulting from smaller storms in the upstream mountain portion of the drainage basin. On January 1, 1976, Morena reservoir held about 2,500 acre-feet of water, Barrett reservoir had about 700 acre-feet, and Rodriguez reservoir held about 2,200 acre-feet.

2.08 Due to the protracted drought and the water storage by the dams, surface flows in the lower Tijuana River valley have been rare since 1945. The estimated average runoff was about 30,000 acre-feet per year for the period 1937 to 1960. Since then, runoff in the lower valley has decreased substantially. From 1960 to 1975, the yearly flow averaged 1,116 acre-feet per year at the boundary gage (table 1). For the same 16-year period, the flow past the Nestor gage, which is at Hollister Street about 3.2 river miles downstream from the international boundary, average 453 acre-feet per year; for 11 out of the 16 years, the total flow was less than 100 acre-feet per year. The locations of the boundary gage and Nestor gage are shown on plate 1.

2.09 A storm in 1825 apparently caused severe flooding; and a flood in 1862 was reported to have been the largest flood ever in the memory of inhabitants at that time. However, no quantitative records are available regarding floods prior to 1877. Medium to large floods occurred in the drainage area in 1889, 1891, 1895, 1906, 1916, 1921, 1937, 1938, 1941, and 1944. The greatest rate of runoff on the lower valley measured by the gages was 17,700 cfs, which occurred during the February 1937 flood. The most severe flood occurred in 1916 when the flow was estimated at 75,000 cfs.

2.10 The 100-year flood, which would inundate about 4,430 acres, has an estimated flow of 80,000 cfs. The 50-year flood has an estimated flow of 50,000 cfs and would inundate 4,200 acres. The standard project flood (an expression of the degree of protection that should be sought in the design of flood control improvements) for the Tijuana River has a magnitude of 135,000 cfs, a probability of exceedence on the average of once in a 300-year period, and would inundate about 4,800 acres. The standard project flood is based on data that includes the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the area in which the drainage basin is located, excluding extremely rare combinations. The extrapolated data were based on a peak storm, occurring January 21 through 24, 1943, centered in the San Gabriel Mountains northeast of Los Angeles. The Hydrometeorological Branch of the National Weather Service has substantiated the validity of using this data.

2.11 GROUND WATER. Ground water in the lower Tijuana River Valley is found in the coastal plain alluvium. Wells drilled in those sediments range from 30 to 100 feet in depth. A preliminary study made in 1963 by the State Department of Water Resources indicated that the estimated storage capacity of the lower Tijuana River valley ground water basin was about 20,000 acre-feet (an acre-foot of water equals 325,900 gallons). The safe yield from the basin was estimated at 5,500 to 6,000 acre-feet per year. Of this amount an estimated 4,000 acre-feet (about 70 percent of the total flow) was contributed by deep percolation from the flow of the Tijuana River as it passed through the area. From 1936 to 1960, about 85,000 acre-feet (3,400 acre-feet per year) of water percolated into the basin from streamflow. This period included two major floods — one in 1937 and one in 1941 and the anomalous period December 1940 to April 1945 of nearly continuous streamflow. During

the 1936 to 1960 period, the subsurface inflow was estimated at 29,000 acre-feet (about 1,100 acre-feet per year). The total input from surface and subsurface flow was 114,000 acre-feet (4,500 acre-feet per year). The net ground water use during the same interval was estimated at 144,000 acre-feet (6,000 acre-feet per year). Thus, the total water loss from the valley aquifers from 1936 to 1960 was 30,000 acre-feet (1,500 acre-feet per year).

2.12 Before 1948, ground water at the upper end of the lower Tijuana River valley was 8 feet below the surface. Since 1948, the normal water table has ranged from about 40 feet below the surface (at about 10 feet m.s.l.) near the international boundary to sea level in the tidal lagoon near the ocean. There is a lack of ground moisture in both the valley alluvium and in the upland parts of the drainage area. At times, the water table in the central and eastern parts of the valley has fallen below sea level.

2.13 During the years 1945 to 1964, the ground water table dropped substantially because (a) the extraction of ground water for irrigation and for export to the City of Coronado exceeded the recharge, and (b) the persistent drought and storage of water by dams in the upper watershed resulted in insufficient ground water recharge. Since 1965, the water levels in many wells (see pl. 1 for two well locations) have risen (table 2). Contributing to this rise in water level has been the occurrence of runoff in 1965, 1966, and 1969, and the termination of pumping of water for the City of Coronado. About 6,000 acre-feet of ground water are pumped annually to maintain irrigated agricultural land.

2.14 The ground water is sodium-calcium in character with the total dissolved solids content ranging from 750 to more than 5,000 parts per million (ppm). The higher sodium chloride concentrations can largely be attributed to seawater intrusion and invasion of connate water from the older sediments. The high fluoride concentrations found in the connate waters are the result of the passage of the water through volcanic tuffs on the higher portions of the drainage basin. Ratings of ground water in the coastal plain for domestic and irrigation use are largely inferior because of these high sodium, calcium, fluoride and chloride concentrations.

2.15 Because of seawater intrusion in the western half of the lower valley and the rapid recirculation of ground water in the eastern half, the salt content has increased to levels that are unsuitable for agricultural use in some areas of the valley. This situation has been further aggravated by the excessive accumulation of salts in the near-surface layers of the soil. This accumulation has resulted from the near-surface evaporation of the brackish waters used for irrigation. Although the same processes have occurred on a lesser scale throughout history, the situation has been periodically improved by the inundation of the valley by floodwaters. These floodwaters have recharge the ground water reservoir, leached salts through infiltration from the surface layers, and deposited an unknown quantity of fertile silts across the valley floor. Because of the prevailing drought and the dams in the upper watershed, the lower valley has not experience a major flood since 1941.

2.16 **VEGETATION AND WILDLIFE.** Data presented in this section on vegetation and wildlife and associated tables are based upon a report prepared for the Corps of Engineers by Ocean Science and Engineering, Inc. (ref. 20) and field surveys and literature searches by Corps of Engineers biologists. The Ocean Science and Engineering biological data are based upon field observations, plant and wildlife inventories and sampling, and reviews of existing literature.

2.17 Most of the lower Tijuana River valley east of the estuary is being or has been cultivated and/or grazed; consequently, the vegetation on most of the flood plain has been altered from its native condition. The only significant habitat areas remaining in the central and eastern parts of the valley are along limited parts of the river channel and within several depleted sand and gravel borrow pits in the riverbed. At least one of these pits forms a semipermanent fresh or brackish water pond. The pockets of riparian growth that do occur provide wildlife habitat and include native and naturalized species. Natural riparian habitats are rare in most of Southern California because: they have been eliminated or highly altered by various land-use activities, including channelization and sand and gravel mining; and few rivers in the region have water to sustain the vegetation.

2.18 At the international boundary and northwest for about 1/2 mile (the eastern portion of the proposed project area), the river channel is very narrow and shallow and has little shrub or tree growth along it. The shrubs and trees that do exist here include willow, tree tobacco, mule fat, and burrobrush. The flood plain adjacent to the channel was formerly cultivated and the plant growth is limited to low grasses and such annuals as field mustard, pigweed, and Russian thistle (photo 3). This land is disked occasionally to keep the area clear. Further downstream, in the vicinity of Dairy Mart Road, the channel widens and deepens and has excellent riparian growth, indicating the availability of ground water (photo 4). Large cottonwoods, black willow, sugar bush, mule fat, tamarisk, saltbush, and eucalyptus are some of the vegetation predominating along and within the channel. Seasonally, water impounds in the borrow pit area or in the riverbed, although one sand and gravel excavation pit has a semipermanent pond. Occasional cattail and some bulrush grow on the edges of the intermittent ponds. West of Dairy Mart Road the river bottom contains a very dense stand of tamarisk and riparian growth extends throughout the sand and gravel pits located along the river channel. Another borrow area is located east of 19th Street. As the river channel approaches the salt marsh, tamarisk and willows diminish and vegetation such as saltbush, goldenbush, and saltgrass predominate. Coastal sage scrub vegetation, including such species as California sagebrush, California buckwheat, laurel sumac, lemonade-berry and prickly pear, occurs on the upland south of the flood plain and into Mexico. The Tijuana River study area lies in an area of general interest to botanists. The southwestern portion of San Diego County has many plants which occur in Baja California and reach their northern distribution limit in this area. Also, several floral components of the area show a close relationship with flora of the Colorado Desert. At least 70 species of plants - trees, shrubs, and herbaceous vegetation - grow along the riverbed (table 3).

2.19 The habitats in the central and eastern parts of the valley support many species of birds as shown in table 4; this table represents a partial listing of birds that have utilized the habitats in the lower Tijuana River valley exclusive of the Tijuana estuary. Many bird species of rare occurrence (vagrants) from Mexico utilize riparian, upland and agricultural habitats in the lower Tijuana River valley. Twenty species of mammals (table 5) and at least nine species of reptiles and amphibians (table 5) have been identified along the lower Tijuana River valley exclusive of the estuary. Ground squirrels, gophers, mice, rabbits, jack rabbits, reptiles and many song birds are usually found in the upper end of the flood plain at the proposed project site. Roadrunners, California quail, rabbits, gopher snakes, and small rodents are some upland species commonly found along the river and in adjacent cultivated and abandoned farmland downstream from the proposed project area. The river bottom and flood plain are also used by many species that normally find relatively undisturbed habitat on the bluffs south of the flood plain into Mexico. Raccoons, opossums, coyotes, and quail

can move back and forth between upland habitat and riparian growth. During the rainy season (winter), many water-associated birds use the grassy fields and agricultural land on the flood plain for feeding. Water-associated birds also feed on irrigated cropland and frequent the riparian habitat along the river, especially when water impounds in the borrow pits.

2.20 TIJUANA RIVER ESTUARY. A joint report by the Bureau of Sport Fisheries and Wildlife and California Department of Fish and Game entitled "Acquisition Priorities for the Coastal Wetlands of California" (ref. 34), cites the exceptional natural resource characteristics of the Tijuana Estuary and places it in the Acquisition Priority A category for coastal wetland acquisition.

2.21 The Tijuana River estuary has been designated as eligible for inclusion in the National Registry of Natural Landmarks. The estuary has not been registered as a site; registration as a natural landmark requires an agreement by the landowners to preserve the significant natural values of the site. It is doubtful that the estuary will be registered under present conditions of land ownership.

2.22 The Tijuana River estuary is a typical of most estuarine systems since it presently receives minimal freshwater runoff and rainfall. Such freshwater as occurs usually enters the estuary during the winter and early spring months. Except for small flows during several days in February 1969 and 1976, the estuary has not received a significant inflow of freshwater from the river since 1952. Thus, its estuarine environment is controlled mostly by the adjacent ocean rather than by river-ocean interactions. However, in terms of major habitats present, the Tijuana Estuary is typical of other relatively undisturbed estuaries in California and Baja California. In general, most of the forms inhabiting the estuary are known to be relatively tolerant of moderately wide ranges of salinity and other environmental conditions that occur on a seasonal basis.

2.23 The estuary (photo 5) and adjacent beach encompass about 1,100 acres of land. The estuary, which has northern, central, and southern arms, extends inland for about 1.5 miles where it merges with the Tijuana River flood plain. The estuary has about 145 acres of tidal channels and intertidal mudflats fringed by about 760 acres of salt marsh, salt flats and maritime vegetation. The beach encompasses about 100 acres. The estimated tidal prism for the estuary is 2.5 million cubic feet (ref. 15). About 270 acres of salt marsh are flooded daily by tidal action. An estimated 500 to 600 acres of high salt marsh and salt flats are flooded by spring range high tides about twice a month. The marsh surrounding the estuary is presently a salt marsh because no freshwater regularly contributes to or flows into the estuary. Consequently, no organisms in the salt marsh or the estuary are dependent upon regular flows of freshwater. The salt marsh vegetation and associated animal species are dependent upon a continuation of the present dry climatic cycle. A climatic shift to a wet cycle would produce a species adjustment in the salt marsh, with those species tolerant of freshwater flourishing.

2.24 The estuary is botanically rich and unique in comparison to other west coast and east coast estuaries since it has a large salt flat environment that provides habitat for a diversity of salt marsh vegetative species. Tijuana Estuary salt marsh vegetation covers an area of about 400 acres (total includes low, middle, and high marsh areas) and has a unique salt marsh biotic community consisting of 31 plant species. Because of the large acreage of

natural vegetation and the high floristic diversity, the estuary-salt marsh complex is considered (ref. 15) one of the finest in southern California. Although most species composing the salt marsh, mudflat, and estuary biotic communities are not endangered, habitats of these type are rare and are considered threatened and endangered throughout southern California. The coastal salt marsh association is represented by typical emergent plants such as pickleweed, saltgrass, alkali heath, saltwort, monanthochloe, and saltbush (table 6). A coastal sage scrub community occurs on the uplands surrounding the estuary.

2.25 Unlike most salt marshes in the state, which have been destroyed or severely damaged by harbor construction and pollution, this marsh is one of the few high quality salt water marshes without development remaining along the California coastline. Its high quality results from rapid tidal flushing and the relative absence of pollution. Saltwater enters the estuary during tidal flows, producing a circulating system that keeps the salinity level fairly constant even during small seasonal runoff flows. Because of its salt content, the estuary is inhabited by fish and invertebrates that are rarely found in fresh or brackish water. Since the early 1960's, freshwater flows into the estuary have occurred infrequently. Great volumes of fresh water, as occur during heavy floods, will kill many salt water species in the estuary; however, infrequent flooding may be beneficial on a long-term basis because the floodwater brings nutrient-rich sediments which are valuable to marine organisms in the estuary.

2.26 The diversity of vegetation, invertebrates and vertebrates indicates the high quality of the area. At least 298 species of birds utilize the estuary and adjacent uplands on either a seasonal or continual basis. At least 86 species of this total are marsh birds, shorebirds, waterfowl, and other water-associated birds which are closely tied to estuarine habitats for part or all of their life requirements. Table 7 provides a partial listing of birds observed in the estuarine areas and the lower Tijuana River valley flood plain.

2.27 The estuary and immediate environs are frequently used for fishing, clamming, swimming, and picnicking, although few formal recreational improvements have been made. Twenty-nine species of fish and 42 species of large invertebrates, such as clams, snails, crabs, and shrimp, occupy the estuary (Tables 8 and 9). Some fish usually found in the estuary are barred surfperch, California corbina, staghorn sculpin, topsmeit, California killifish, California halibut, spotted turbot, kelp bass, opaleye, and striped mullet. At least six species of clams are taken by clambers, with chiones and purple clams being the most abundant. There is no closed season for clamming but it is less frequent in the summer months. Ghost shrimp and jackknife clams in the estuary are also used to a minor extent by the commercial bait fishery. At least 20 mammal species either reside in the salt marsh habitats or regularly visit the estuarine area.

2.28 **THREATENED SPECIES.** The following six species of birds, which are listed in the U.S. Department of Interior's "Threatened Wildlife of the United States" (ref. 22), and the California Department of Fish and Game report on endangered and rare fish and wildlife, entitled "At the Crossroads 1974" (ref. 23), inhabit the salt marsh, estuary or adjacent beach and uplands: American peregrine falcon, California brown pelican, California least tern, lightfooted clapper rail, Belding's savannah sparrow, and black rail. The California Fish and Game Department lists the black rail as rare and all the other species mentioned as endangered. The peregrine falcon has been infrequently observed utilizing the terrestrial parts of the estuary and adjacent uplands; a sighting of the peregrine falcon was made in the

lower Tijuana River valley study area on December 20, 1975. The brown pelican feeds in the open sea off the coast and rests on the tidal flats. The least tern nests and feeds in the area; five pairs nested on the sand pit near the estuary mouth in 1973. The clapper rail is entirely dependent upon the salt marsh; 40 clapper rails were counted in the tidal marshland during a high tide on January 7, 1974 (ref. 27). Belding's savannah sparrow is closely associated with the pickleweed habitat occupied by the light-footed clapper rail. The black rail has not been observed in the estuary for several years and probably is extinct in San Diego county. This bird, if present, would be dependent upon the salt marsh habitat around the estuary since freshwater marsh habitat is rare or non-existent in the area. Other birds in the estuary and beach area that are considered locally rare by ornithologists include: the snowy plover, the white-tailed kite, and doubled crested cormorant. The elegant tern, whose only nesting site in the U.S. is located at South San Diego Bay, also frequents the estuary to feed. With the possible exception of the peregrine falcon, no threatened or endangered wildlife species are known to inhabit or utilize the proposed project area, which is at least 3 miles from the salt marsh estuary habitats.

2.29 The report on Endangered and Threatened Plant Species of the United States (ref. 26) lists the salt marsh bird's beak as a threatened plant species. This plant's only location in San Diego County may be the Tijuana River estuary. Several other plant species along the riverbed or surrounding uplands are of particular interest to botanists because of local rarity or anomalous occurrence in this region. No endangered or threatened plant species are known to occur along the river channel. The wildlife and plant species considered rare, threatened, endangered or unique to the lower Tijuana River valley and estuary are listed in table 10.

2.30 VECTOR PRODUCTION AND DISEASES. Breeding habitat for saltwater and freshwater mosquitoes exists in the lower Tijuana River valley. Favorable freshwater vector breeding habitat usually exists only during the rainy season (November-March) when rainfall ponds in the channel, borrow areas along the channel, and depressions and poorly drained areas over the flood plain. Mosquito species responsible for carrying encephalitis and malaria have been identified in this area. Since the San Diego area has many military personnel that travel around the world, a potential reservoir exists for these diseases. A vector ecologist from State of California Vector Control stated that no empirical evidence is available to indicate that the lower Tijuana River valley has any greater potential for vector-borne disease problems than other places in San Diego County. The San Diego County Health Department has sprayed for mosquito control in the past in the Tijuana River valley, especially during the infrequent times when water coming from Mexico has contained untreated effluent from sewage line breaks; water contaminated with sewage effluents has high levels of dissolved organics that produce good mosquito breeding habitat.

2.31 LAND USES. The land uses on the 4,800-acre standard project flood (SPF) overflow area are listed below.

EXISTING LAND USE	APPROXIMATE ACREAGE
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Residential	32
Commercial	44
Public	10
Roads (Improved)	33
Sand and Gravel operations	90
Agriculture, forage crops	950
Open space, pastures, etc.	1,857
Estuary and beach	1,100
Border State Park	684

TOTAL	4,800
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2.32 In 1957 about 50 percent of the valley was under cultivation in fruits and vegetables and forage crops. By 1965, primarily because of saline soil and ground water conditions, only 30 percent of the valley was under cultivation. Presently (1976), about 20 percent of the valley, or 950 acres, is being used for cultivation of crops that are resistant to the high soil salinity. Of the 950 acres currently in production, about 475 are utilized for irrigated truck crops, with the balance in pasture and forage crops. The value of production is estimated at \$1.75 million for 1976. Four dairy farms, supporting about 2,200 cows, and several horse and cattle ranches occupy an additional 1,000 acres of the valley lands for a total of about 2,000 acres of actively-used agricultural land. Because of increased land values, increased taxes, high labor costs, decreasing productivity, and increased costs of imported water, most farmers have sold their lands. Some lease it back for farming on an annual basis.

2.33 Most of the lower Tijuana River valley is undeveloped. About 1,100 acres are beach and estuary with about 500 acres of the estuary subject to tidal waters. The Tijuana River bed provides a rich source of sand. There are several companies operating sand and gravel pits in the flood plain, totaling about 90 acres of active and inactive sites. Sand extraction is currently (1976) underway in the river bed and along the international border west of Dairy Mart Road.

2.34 The urbanized portion of the lower Tijuana River valley lies in the eastern end of the valley directly adjacent to Interstate 5. About 32 acres are devoted to residential use; 44 acres to commercial development; and 10 acres for public use (Willow Elementary School). Improved roads account for about 33 acres in the SPF overflow area. The urbanized land east of Dairy Mart Road has over 100 single family dwellings, a motel, school, and a strip of commercial development along Interstate 5. Land in this area is generally held in small blocks by individuals or companies.

2.35 The State of California owns or leases 684 acres of valley land as part of Border State Park. In addition, in 1974 the State legislature provided \$3,000,000 to purchase about 400 acres of privately-owned beach and estuary lands near the mouth of the Tijuana River. Negotiations are currently underway to purchase this land. The proposed park lies west of 19th Street and includes land within the cities of Imperial beach and San Diego which is leased to the State by the Navy.

2.36 The Imperial Beach Naval Air Station contains 1,204 acres including 283 acres leased to the State, and 154 acres leased for agriculture. The base functions as a training facility for helicopter pilots, with total military and civilian employment of about 3,000. The base is in the process of being phased out as an active military facility, and by the end of 1976 will be used as a secondary landing field for North Island Naval Air Station. Only a small operations crew will be retained at Imperial Beach.

2.37 The northern rim of the valley is occupied by the communities of San Ysidro and Nestor (both annexed into the City of San Diego) and the City of Imperial Beach. The City of Tijuana is located along the south perimeter of the lower Tijuana River valley. Ports of Entry to and from Mexico for commercial and non-commercial vehicles are located in San Ysidro about 1/2 mile east of the Tijuana River. All of the lower Tijuana River valley flood plain lies entirely within the incorporated area of San Diego except for a coastal strip of land of about 960 acres, mostly estuary wetland, which is within the City of Imperial Beach.

2.38 POPULATION AND ECONOMY. The population within the Tijuana River valley SPF (4,800-acre) study area is about 650; of this population 450 live immediately west of Interstate-5 in the San Ysidro corridor. The San Ysidro population in the floodway near I-5 is comprised of lower income laborers, a high percentage of whom are Mexican-Americans. Their houses are mostly high density single family units, with an average unit structure value of \$15,000. Seven houses in Imperial Beach with 20 residents and two apartment buildings are within the SSPF overflow area. The houses are in the vicinity of 5th Street and Oneonta and are subject to SPF inundation to a depth of 6 inches; the houses are in the \$30,000-\$40,000 range. The two apartment buildings are located along First Street on fill in the estuary and are also subject to SPF inundation to a depth of about 6 inches. The balance of the population in the study area is downstream from Dairy Mart Road, and consists of persons residing at scattered farms and ranches.

2.39 There are no major employment centers in the Tijuana River Valley. Employment in the valley is limited to the commercial strip bordering I-5 and a few farmers and laborers in the rest of the valley.

2.40 The San Diego County Comprehensive Planning Organization (CPO) has defined a South Bay Subregional Area (SBSA) which consists of the communities of San Ysidro, Nestor, Otay Mesa, and the City of Imperial beach; with the exception of Otay Mesa, the SPF overflow area affects portions of these communities. The SBSA population, according to a 1976 special census was 65,386. The population has increased by 16,398 since 1970, representing an annual growth rate of 6.7 percent. Most of the increase has been in the San Ysidro (4,481), Nestor (4,522) and Otay Mesa (6,604) areas, with Imperial Beach registering a small (460) gain. In 1970, 26 percent of the SBSA population was Mexican-American; a majority of the San Ysidro population is of Mexican descent.

2.41 The South Bay Area currently (1976) has 19,500 housing units, of which 31 percent are multifamily units. The vacancy factor has decreased from 8.5 percent to 4.5 percent since 1970, possibly because of a recent slack in new housing starts. Housing prices overall tend to be lower than the San Diego County average.

2.42 A firm employment base is lacking in the South Bay area. Unemployment is about 13 percent and many of the residents have to commute to Central San Diego, National City, and areas to the north for employment. The median household income for the South Bay is \$9,750, compared to a countywide average of \$10,982. The major employment industries are manufacturing, 20 percent; retail trade, 20 percent; services, 24 percent; and government, 27 percent. Of the total population over 25 years old, 55 percent have a high school diploma and 5.6 percent are college graduates. Major employment centers for South Bay residents are Rohr Aircraft in Chula Vista and North Island Naval Air Station.

2.43 The population of the City of Tijuana, located along the south perimeter of the Tijuana River Valley, is estimated at 500,000. Spending by Mexican nationals crossing the border into the South Bay is a significant factor in the local economy, with these purchases totaling \$382.5 million in 1974. Northbound border crossings at San Ysidro in 1974 totaled 34,155,570.

2.44 TRANSPORTATION. Interstate 5, which borders the flood plain along the northern rim of the valley, is the main transportation artery in the area. The San Diego and Arizona Eastern Railroad parallels Interstate 5 and provides a connecting link between the cities of San Diego and Tijuana. The developed portions of San Ysidro, Imperial Beach, Nestor and Otay Mesa, generally have an adequate system of surface streets. Because of the lack of development, only a limited number of streets serve the lower Tijuana River valley. Dairy Mart Road, Hollister Street and 19th Street cross the valley north to south. Monument Road runs east and west along the southern boundary of the flood plain. Tia Juana Street (paved) runs east-west and connects Dairy Mart Road with Willow Street in San Ysidro. Imperial Beach and San Ysidro are served by local bus routes.

2.45 DEVELOPMENT IN TIJUANA. Mexico has cleared and is redeveloping lands in the Tijuana River flood plain in conjunction with their flood control channel construction. This redevelopment program includes municipal offices and civic center, a hospital, commercial offices, restaurants and shops, parks, and major thoroughfares, within a coordinated plan to beautify the area. Resettlement in newly constructed housing areas outside the flood plain of families that previously resided in the flood plain has been completed. The newly developed area and the resettlement housing areas are provided with all utilities. Urban expansion is occurring westward of Tijuana toward the Pacific Ocean. Surface flows from this area northward into the lower Tijuana River valley appear to be accompanied by an increased sediment load.

2.46 WATER AND SOLID WASTE POLLUTION. Before Mexico cleared the area along the river channel and resettled the low income families that were residing in and along the river channel, solid waste products and litter were frequently dumped in to the Tijuana River channel. Infrequent surface flows or runoff of the river previously has carried an accumulation of trash, litter and waste products downstream onto the flood plain in the United States for at least one-half mile below the boundary (photo 7). With the resettlement program of persons residing in the flood plain to new housing at other locations, solid waste and water pollutant contributions to the Tijuana River channel have been reduced. Solid waste and water pollutant contributions from minor tributaries entering the valley west of the Tijuana River boundary crossing have continued. Unauthorized disposal of refuse has occurred in the sand and gravel pits located along the Tijuana River downstream from the

proposed project area. The potential exists for this refuse and trash to be carried along the Tijuana River channel by floodflows and reach the estuary. Such pollution would degrade downstream habitats and present a potential pollution hazard for the Tijuana Estuary. The pollution hazard from the trash and debris would be mostly visual with limited physical or biological degradation of the channel or estuarine habitats expected.

2.47 The Tijuana River water which flows across the border during and after the infrequent periods of rainfall is a mixture of rural runoff from upstream portions of the drainage area and urban runoff from Tijuana. The urban runoff, which contains gutter washings, is usually highly turbid, has elevated bacteria counts and contains trash and debris. The situation is not unique to the City of Tijuana but is characteristic of urban runoff from cities in California. This urban runoff temporarily pollutes the Tijuana River; however, because of the temporary nature of the problem, long periods without flow, and great variability of flow volume, it is infeasible to treat storm water before release into the environment (ref. 30). The temporary flows of polluted water in the Tijuana River do not cause a significant pollution of ground water quality and contribute low saline water to ground water aquifers.

2.48 The City of Tijuana has a municipal waste and refuse disposal system. Their sanitary sewer system previously served only a portion of the city. During the period since 1969 the city has expanded its sewer system and, at the end of 1974, had a total of 230 miles of sewers. Tijuana's system now provides service to two-thirds of the population, with further expansion continuing. A program is being implemented to replace all inadequate sanitary sewer mains with larger capacity sewers. Prior to initiation of construction on Mexico's flood control channel, the area in the flood plain was not served by sewers and, during floods, there was a possibility that flood overflows could transport sewage from privies. This flood plain area has now been cleared as a part of the channel construction and sewers have been installed in the redeveloped area. Mexico also is extending the flood channel and clearing the flood plain upstream to the confluence of Cottonwood creek and Rio De Las Palmas and will include sewers. No sanitary sewers will discharge to the Tijuana River. The possibility of flood runoff including domestic sewage is reduced as the sewer system is expanded.

2.49 Breaks in sewage lines have occurred in the City of Tijuana on infrequent occasions, allowing untreated sewage to flow across the boundary into the United States. These breaks are generally of short duration and are usually repaired within a few days. Breaks in sewage lines are not unique to the City of Tijuana but have occurred in San Diego (i.e., raw sewage emptied into Mission Bay in 1975) and many other United States cities. At times of heavy rain and flood runoff, the coliform counts in water samples from flows crossing the international boundary have reached high levels and caused concern to the County Health Department; mosquito control activities have been increased at times, as is the case in other county areas. The runoff and sewage is usually retained in pits in the channel, percolates into the ground and does not reach the Tijuana Estuary. During the last 30 years, few surface flows have reached the estuary, even during the rainy season. During about 85 percent of these years, flows have percolated into the ground at least 2 miles upstream from the estuary.

2.50 The City of Tecate in Mexico has discharge untreated sewage to Tecate Creek, about 25 miles east of the City of Tijuana. Tecate Creek flows into Cottonwood Creek in Marron Valley, California, near the international boundary. Cottonwood Creek then flows 16 miles in Mexico before joining with Rio de las Palmas to form the Tijuana River. The Tecate effluent percolates into the ground before it reaches Tijuana River. Only under flood conditions would the Tecate effluent be carried into the United States near San Ysidro; under flood conditions it would be highly diluted. The City of Tecate has constructed a primary sewage treatment plant which is expected to be placed in operation in the near future, and which will eliminate the discharge of untreated sewage.

2.51 Within the United States, in the lower Tijuana River valley, agricultural activities potentially influence the quality of runoff water during heavy rainfall or flood conditions. Animal wastes from four large dairy farms, fertilizers, and pesticides used on irrigated croplands are possible sources of pollution. The absence of any substantial rainfall for many years has minimized runoff that could contribute pollutants to the Tijuana Estuary and salt marsh ecosystems. Secondary effluent from Ream Field and the City of Imperial Beach emptied into the estuary until the mid-1960's, when the discharges were terminated. The estuary today (1976) has low nutrient levels, based on unpublished data gathered by biologists from Scripps Institute of Oceanography at La Jolla, California, which show very low nitrate, phosphate and ammonium levels within the estuary. Pollution of the estuary is very minimal, especially in comparison to lagoons within San Diego County. Agricultural land use near the estuary is mostly pasturing of cattle because the soil salinity has precluded truck crop farming. Any pesticides and herbicides used on the croplands in the eastern half of the valley are unlikely to affect the estuary, which is located a minimum of two miles west; the lack of runoff and river flow minimizes the potential for such pollutants reaching the estuary. A major factor contributing to favorable water quality in the estuary is its rapid and thorough tidal flushing.

2.52 AIR QUALITY. An air quality monitoring station, which was located at San Ysidro until it was moved to Imperial Beach Naval Air Station in July 1975, monitors the San Ysidro air basin which covers the Tijuana River valley. The lower Tijuana River valley contains a high level of particulate matter, due primarily to uncontrolled particulate sources in Mexico, and secondarily to cultivation of agricultural fields in the valley. State particulate matter standards were exceeded in 1975 for 93 percent of the samples taken at the San Ysidro station and 38 percent of the Imperial Beach station samples.

2.53 The lower Tijuana River valley is primarily an agricultural and open space area with little urbanization and industrial development. Because power plants and industry are the primary sources of sulfur dioxide, these air pollutants are minimal in the valley. The State and Federal standards for sulfur dioxide were not exceeded in the lower Tijuana River valley or the San Diego area during 1975. The freeway leading to Mexico is heavily traveled and is the major source of carbon monoxide, oxides of nitrogen, and hydrocarbon air contamination. Air contaminants from the City of Tijuana also contribute to the area's air quality problem.

2.54 Motor vehicles are a major source of air pollutants in the San Diego area. Oxidant levels have been used as a convenient indicator of smog formation since the early days of air pollution monitoring. High concentrations of oxidants may cause eye irritation (0.10 ppm, the State Standard, causes some people to experience eye irritation), reduced athletic

performance and damage to plants. During 1975 total oxidants at the San Ysidro and Imperial Beach monitoring stations exceeded the State Standard (0.10 ppm) and Federal Standard (0.08 ppm) on 28 and 45 days, respectively. However, in spite of the heavy increase in motor vehicle traffic, air quality control programs underway since 1966 have reduced total oxidant levels in San Diego County.

2.55 Prevailing sea winds from the northwest or southwest dominate the coastal area and result in low smog concentrations in the beach areas. Air contaminants are moved eastward where stagnant conditions frequently occur in the inland valleys. San Diego experiences more temperature inversions than any other city in the State, a factor that contributes to the smog problem. Urban development of the Tijuana valley, or portions of it, would probably result in an increase in the total pollutants discharged in San Diego. Considering the projected population growth, the frequency of temperature inversions, the increased use and number of vehicles, and the increased discharge of pollutants into the air, San Diego could face a severe air quality problem. Deterioration of San Diego air quality may lead to a deterioration of the air quality in the Tijuana River valley. The Environmental Protection Agency has proposed stringent controls for the San Diego area to guarantee that Federal air quality standards will be met by 1977.

2.56 RECREATION. The Naval Air Station at Imperial Beach acquired 664 acres of land east, south and west of the station to serve as a buffer zone, insuring the integrity of their flight operations. In August 1971, the U.S. Navy's Border Field, south comprising 378 acres of the air station, was conveyed to the State of California for use as a state park (Border State Park). The conveyance of Border Field to the State contains a reservation of 56.28 acres for the original flood control project channel. An additional 23 acres have been acquired from the U.S. Navy as part of the park. The park, which is presently under development, includes a wide sandy beach that extends more than a mile from the international border to near the mouth of the Tijuana River estuary. The State Park System has leased 283 acres of estuary and surrounding maritime lands from the Imperial Beach Naval Air Station, bringing a total of 684 acres under State Park management. The leased portion of the park will serve as a wildlife refuge for wildlife species inhabiting or using the saltmarsh and estuary. The State Parks Department has prepared a general development plan, proposing expansion of the park east to about 19th Street.

2.57 Present park facilities for daytime activities include parking areas and temporary comfort stations. Few additional improvements are programmed other than road improvements, permanent comfort stations, landscaping and additional parking areas. Low intensity park uses are encouraged as an aid to preserving the natural character of the estuary. In 1975, the park attracted an estimated 140,000 visitors for all uses. With the additional improvements, park usage should significantly increase. The estuary and adjacent land provide recreational opportunities for fishing, shell collecting, clamming, hiking, bird watching, and nature study. The beach and ocean are used in the summer for sunbathing, swimming, and fishing. Trail bike and dune buggy enthusiasts extensively used the beach and estuary margins until the City of Imperial Beach and the Department of Parks and Recreation limited their access. Access to Border State Park is provided by an unimproved road leading from Monument Road. The estuary is surrounded by private and military land, and other access roads leading to the estuary have been blocked off. Students and faculty at the University of California at San Diego, California State University at San Diego, Grossmont College, various junior colleges, high schools and grammar schools derive educational and scientific benefits from the estuary because of its botanical and fish and wildlife resources.

2.58 The lower Tijuana River valley also contains at least 10 boarding stables. Horseback riding, which is very popular in the area, occurs mostly in the wetland area and on trails and dirt roads on the mesa to the south. The agricultural land uses of the valley, the minimal extent of paved roads and motor vehicle travel, the wetland area, and the chaparral community on the mesa to the south combine to provide an attractive area conducive to horseback riding. There also is a posted bicycle route in the valley.

2.59 HISTORICAL, ARCHEOLOGICAL, AND CULTURAL FEATURES. The lower Tijuana River valley has few historical and archeological sites. Two features of historical interest are a marble boundary monument and Smuggler's Gulch, which is believed to be the site of a camp made by Father Junipero Sierra in the 1700's. The boundary monument, formally known as "Boundary Monument Number 258," is an 11-foot-high obelisk, several hundred feet east of the beach, marking the near western end of the United States-Mexico land boundary. Neither the marble obelisk nor the Smuggler's Gulch campsite are within the proposed project area or alternative sites considered. Two or three archeological sites are along the southern edge of the valley near the boundary monument. In each case, the sites are poorly defined, relatively thin Indian middens. Artifacts that have been collected from the sites include materials from the Diegueno, La Jollan, and San Dieguito cultures which inhabited the coastal plain during the last 7,000 years.

2.60 The State Historic Preservation Officer was contacted about the presence of historical and archeological resources in the proposed project area. His letter of August 1, 1973 (see appendix) indicated that no state historical landmarks, state points of historical interest or sites in the National Register of Historic Places are located in the immediate area of the project. However, the State Historic Preservation Officer could not state that such resources were not located in the proposed project area. According to his suggestion, archeologist Ronald May was contacted to make a field survey of the proposed project site. The survey (ref. 21) revealed that no archeological or historical sites, features or artifacts were located within the project area. However, one prehistoric camp site was located on the proposed realignment of Dairy Mart Road. Some artifacts were collected from the site. Mr. May stated in his survey report that subsurface material at the site may contain valuable information.

2.61 FUTURE ENVIRONMENTAL SETTING WITHOUT THE PROJECT. The future of the lower Tijuana River valley is primarily dependent on the planning concepts adopted and implemented by the City of San Diego, since they hold jurisdiction over most of the flood plain. The City of San Diego is coordinating its Draft Tia Juana River Valley Plan and Environmental Impact Report (ref. 35) for public review and comment. The report presents a comprehensive plan for agriculture, conservation and recreation in the Tijuana River valley in accordance with the energy dissipator plan (III-A) approved by the City Council in 1973 (ref. 7). The city's proposed plan for future land uses of the lower Tijuana River valley is a significant departure from the existing Border Area Plan adopted in 1967, which included a flood control channel to the ocean and urbanization of the valley flood plain. The city's currently proposed plan: (a) adopts plans of the California State Park System to expand Border Field State Park; (b) recommends construction of the energy dissipator to meet international obligations to Mexico; (c) provides for restoring the valley's agricultural potential; and (d) incorporates the City's General Plan goals of open space preservation by conservation of agricultural lands, and salt marsh, estuary and coastal water areas. This land

use plan will be proposed for City Council approval and adoption as a replacement of the existing Border Area Plan.

2.62 City of San Diego planning goals emphasize preserving the Tijuana Estuary and wetlands. They also propose retaining and enhancing agricultural land uses in the eastern portion of the lower Tijuana River valley. Agricultural land uses of the valley complement plans to preserve the estuary. Open space uses of the valley are desired to preserve a green belt between the heavily urbanized Tijuana and San Diego metropolitan areas.

2.63 To promote continued agricultural usage of the lower Tijuana River valley and improve productivity, the city has proposed a local program to import water, possibly from the County Water Authority aqueduct terminus at Otay Reservoir, to overcome problems of saline ground water supply and salt built-up in the soil. Such a program would enhance the agricultural productivity of the valley and is virtually necessary to insure the survival of extensive agricultural land uses.

2.64 The city will implement a flood plain management program to minimize property losses in the flood plain without structural flood protection. Limited urban development of the flood plain is expected. Flood plain zoning for land uses compatible with little or no flood protection, such as agriculture and recreation, would be applicable. About 91 percent of the valley land under the city's jurisdiction is currently zoned for agricultural use. Modification of this zoning to floodway and flood fringe zoning is proposed, to be compatible with continued agricultural use. Some idle agricultural land in the proposed flood fringe zone along the I-5 corridor is currently being developed. Landfill has been placed on 45 acres of land between 27th Street and Hollister Street (pl. 1) to raise the land above the 100-year flood level. The proposed developments include a high density trailer park community, high density apartment housing and a commercial area.

2.65 The City of San Diego Planning Department estimates that the population within a 5-mile radius of the lower Tijuana River valley may include 1.2 million people by 1990. Growth within the City of Tijuana accounts for the greatest portion of this estimate. San Diego Comprehensive Planning Organization's population projections show the South Bay Area growing to 78,600 by 1985 and 96,100 by 1995 (2.4 percent annually, 1975 - 1995). Using California Department of Finance D-100 projections, the South Bay area population is estimated at 84,100 by 1985, and 101,900 by 1995 (2.8 percent annually, 1975-1995). The present population of about 650 in the study area probably will not significantly increase, because of the lack of flood protection. Primary areas available for development within the South Bay area lie in the Otay Mesa and San Ysidro areas east of I-5. Out of a total of 28,900 acres available for development in the area, 6,600 were developed as of 1975 and total developed acres in 1995 is expected to be 9,400. In view of the availability of residential land with existing utilities and public facilities in other areas in the South Bay, the City of San Diego presently does not favor major expenditures to provide flood protection to the entire valley.

2.66 A two-lane highway running from the international boundary near Border State Park north to I-5 has been proposed by the State legislature. However, the California Department of Transportation is not currently (1976) studying the need of this highway. Government Services Administration (GSA) indicates the need for an additional border crossing near the ocean; however, this site is downstream from the proposed project. San Diego Gas and

Electric Company has mentioned a 122-acre tract of their land adjacent to Border Field State Park near the estuary as a possible nuclear power plant site. Mexico has under construction about 8 miles of concrete-lined channel in addition to the 2.7-mile section of concrete-lined channel almost completed through the City of Tijuana. About 11 miles of concrete-lined channel will eventually pass through the City of Tijuana.

2.67 No actual structures along the flood plain perimeter in the City of Imperial Beach will be affected by a 100-year flood. Seven houses and two apartment buildings in this city will be flooded to a depth of six inches by a SPF. This magnitude flood is estimated to occur once every 300 years. Much of the undeveloped lands in the southern part of the city is estuary wetlands. The City of Imperial Beach Open Space and Conservation Element to the General Plan (ref. 37) designates an Urban Reserve Category for portions of Imperial Beach within the SPF overflow area (mostly Tijuana Estuary and wetlands). The city would propose some development of their estuary lands if and when unresolved conflicts are settled. Without flood protection and because of current opposition from agencies with regulatory jurisdiction over the estuary, the urban reserve land probably would not be developed.

2.68 OTHER FEDERAL PROJECTS IN THE AREA. The Corps of Engineers has an authorized project for beach erosion control at Imperial Beach. The authorized project is presently being studied and re-evaluated. The project probably will comprise sand fill, and structural measures to stabilize the sand fill and prevent its future erosion. Imperial Beach will be used as a spoil disposal area for the San Diego Harbor navigation project now under construction (ref. 32). Dredge material is expected to be placed on Imperial Beach this summer (July 1976). Under normal seasonal conditions, it is not anticipated by the Corps of Engineers that the seasonal reversals of the predominant upcoast movement of littoral material is great enough to create a shoaling problem for the Tijuana Estuary.

3. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01 The proposed plan was developed to complement the planning goals of the City of San Diego for the lower Tijuana River valley. The San Diego City Council in its resolution No. 208684 dated October 30, 1973 adopted its Alternative III-A as the conceptual land use plan and flood control alternative that satisfied their planning goals for the Tijuana River valley. A refinement of this plan dated January 1976 called "Tia Juana River Valley Plan and Environmental Impact Report," is currently (May 1976) being coordinated for public and agency review. Upon City Council approval and adoption, this plan will replace the City Council approved 1967 Border Area Plan. The January 1976 plan does not provide flood protection to about 3,950 acres of flood plain. The City of San Diego will retain most of the area under their jurisdiction in agriculture and other open space land uses. With implementation of the proposed action, the city proposes a separate program of water importation to help overcome the problems of water supply and soil salinity and to enhance agricultural productivity. This water importation program will be applicable only with a project which will permit continued agricultural uses in the valley.

3.02 The Comprehensive Planning Organization (CPO) of the San Diego region supports the proposed project. CPO is advisory regional planning group composed of a voluntary association of local governments. The following policy statement (ref. 29) was developed in 1974 concerning planning in the Tijuana River Valley:

"The regional policy regarding the Tia Juana Valley should be to build a flood control system sufficient to meet the international treaty with Mexico, protect life and property in the 1973 existing urbanized area from the dangers of flooding and health hazards caused by polluted water, and preserve the estuary and its wildlife habitat. The International Boundary and Water Commission and the Corps of Engineers should show specifically as part of the environmental impact statement that any system proposed by them will clearly satisfy these requirements. Flood plain zoning will be applied as part of the flood control system."

3.03 Structural alternatives for flood control in the lower Tijuana River valley, other than the proposed energy dissipator system, would not meet City of San Diego and Comprehensive Planning Organization planning goals or environmental objectives for the area. Construction of the project and implementation of flood plain management by local interests will realize the stated goals of these agencies. Urbanization of much of the flood plain in conjunction with other alternatives and its accompanying impacts will jeopardize the integrity of the Tijuana Estuary and surrounding habitats and their associated wildlife. The proposed action does not conflict with California Department of Fish and Game, California Department of Parks and Recreation, and U.S. Fish and Wildlife Service objectives, which specify protection and preservation of the Tijuana Estuary and salt marsh habitats. The agencies support the proposed plan.

3.04 The California Coastal Plan (ref. 31) designates the Tijuana Estuary as a special study area and a priority acquisition site. That plan calls for preservation and protection of the Tijuana Estuary and agricultural lands within the lower Tijuana River valley. Conversion of valley agricultural lands to urban uses would be contrary to Coastal Plan policies. The Coastal plan recommends acquisition of the estuary and establishment of a 2,000-acre park, consistent with California Department of Parks and Recreation goals.

3.05 A proposed, although controversial, regional airport located east of the Tijuana River valley on Otay Mesa could affect land use in the valley. The lower Tijuana River valley would be below the flight path of aircraft from the proposed regional airport. Retention of the valley for agriculture and recreation, as proposed by the City of San Diego would be more compatible with development of the airport than urbanization, which would place homes in a noise prone corridor.

3.06 The General Plan for the City of Imperial Beach (Ref. 38) prepared in 1968 proposed land uses based on a flood control channel from the international boundary to the ocean that would provide flood protection to undeveloped flood plain estuary lands in the City of Imperial Beach. The city's land-use plan specified development of a marina in the estuary and provision of associated ancillary facilities. The 1937 Open Space and Conservation Element of the General Plan (Ref. 37) recognizes the controversy over proposed

development of the estuary and, in view of a lack of flood protection which would allow development of a marina, places the city's estuary lands in an Urban Reserve category to include some future development if and when unresolved conflicts are settled. The proposed action does not provide flood protection within the area of Imperial Beach extending into the estuary; this lack of flood protection would be a deterrent to the development of a marina. Development of the Tijuana Estuary within the City of Imperial Beach, however, would be contrary to California Department of Parks and Recreation, California Department of Fish and Game, California Coastal Zone Conservation Commission, U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers goals for protection and preservation of the Tijuana Estuary.

4. THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

4.01 INTERNATIONAL RELATIONS. By international agreement the United States and Mexico agreed to a flood control project for the Tijuana River Valley. Construction of the proposed project will satisfy the objectives of our international commitment and will allow Mexico to complete its channel to the international boundary. The completed international project will afford protection to the City of Tijuana, where the flood plain is almost completely urbanized and no practical alternative to channelization exists.

4.02 FLOOD PROTECTION. Once completed, the concrete channel in Mexico will discharge concentrated floodflows into the United States at a greater velocity than would occur under natural conditions. The proposed project will reduce the floodflow velocities from Mexico and discharge the flow into the United States below the relocated Dairy Mart Road at about the same velocity as would exist under natural conditions. The channel and flood plain downstream from the intersection of the low-flow channel will remain. Floodflows will continue to scour the unimproved stream channel and pick up and transport sand and sediments to the ocean through the Tijuana Estuary. About 3,950 acres of flood plain (excluding project right-of-way and the flood-protected area) will still be vulnerable to flooding.

4.03 About 400 acres of the lower Tijuana River Valley overflow area will receive flood protection from the SPF. The proposed northern levee (pl. 2) will protect a corridor of mostly open space land with some low density residential development (in the community of San Ysidro) between the levee and Interstate 5. The project will protect existing developments in this corridor from flood damages estimated at \$176,000 annually. The City of San Diego will permit low to medium density residential development (single family dwellings and apartments), tourist-oriented commercial development and an industrial park in this protected corridor if the project is implemented (pl. 3). The increased land utilization value of the area, assuming implementation of the City of San Diego's Tia Juana River Valley plan, will be about \$270,000 annually. This value is based on flood damage reduction benefits and savings in cost of fill for future development. The southern levee will prevent backwash flooding into the City of Tijuana. The proposed project will not interfere with the regular Port of Entry to and from Mexico or the commercial Port of Entry; instead it will have the beneficial impact of providing flood protection for these border crossing facilities.

4.04 The City of San Diego proposes land uses for the remainder of the valley that do not require flood protection. New developments will be permitted only if protected above the 100-year flood level. The city will permit agricultural and recreational land uses that will experience minimum losses from floods. To enhance farm productivity and overcome problems of water supply and soil salinity the City proposes a program to provide adequate irrigation water. The California Department of Parks and Recreation proposes expansion of Border State Park to possibly include all valley wetlands and adjoining uplands from the ocean to about 19th Street. Additional recreational developments have been proposed by the city, including ancillary facilities on the mesa near the international boundary. Occasional flood damage to agricultural land, recreational facilities, public improvements and the estuary will occur. No urbanized portions (actual structures) of the Cities of Imperial Beach or San Diego located along the flood plain perimeter will be affected by a 100-year flood. Seven houses and two apartment buildings in the City of Imperial Beach along the Tijuana Estuary will be flooded by a SPF to a depth of about 6 inches. Equivalent annual flood damage to the houses and apartment building will be about \$2,500. Flooding would be so infrequent (about once every 200 to 300 years) that structural preventive measures could not be justified. As viewed by the City of San Diego, non-urbanization of the flood plain eliminates the need to construct complete flood control facilities through the entire lower Tijuana River valley. Population pressure is not yet a factor necessitating flood protection in order to allow intensive development of the flood plain.

4.05 LAND USE. Except for the acreage needed to construct it, the proposed project will not change conditions of most of the flood plain land. An indirect impact of the proposed project will be urban and commercial development of about 400 acres protected from flooding that is now primarily in agricultural use or is idle open space. The increase in population would be about 2,500 in the flood-protected corridor, assuming about 160 acres are developed into residential use. About 110 acres would develop into an industrial park and commercial development and would help create a much-needed employment base in the South Bay. The proposed project will occupy about 454 acres of agricultural land (productive and potentially productive but idle) and some of the Tijuana River Channel. Residents of 4 dwelling units within the project rights-of-way will require relocation; the structures will be removed. About 60 acres agricultural land and 10 acres of sand and gravel mine will be removed from production by the structural facilities. The 283-acres sediment deposition area will occupy idle and potentially productive agricultural lands. Continued and new agricultural land uses may be allowed within the sedimentation area, since this land use would not significantly affect the potential flood damage hazard. The sedimentation area will be available for any multi-purpose open space use compatible with maintaining the velocity reduction and sediment deposition capacity. Downstream from the proposed project, the flood plain lands will continue to be vulnerable to flooding and sediment deposition. This could prove helpful in improving the ground water and soil salinity problems. Plate 3, taken from the City of San Diego's January 1976 "Tia Juana River Valley Plan and Environmental Impact Report," shows proposed land uses in the study area assuming the proposed project is constructed. The project will eliminate Tia Juana Street, a paved road running east from Dairy Mart Road.

4.06 LAND USE PLANNING. The proposed action will permit the City of San Diego to meet its environmental and land-use planning goals and objectives for the Tijuana River valley as specified in its 1976 Tia Juana River Valley Plan. The proposed action will not allow the City of Imperial Beach to develop Urban Reserve land proposed in its general plan since flood protection will not be provided to the estuary. However, development of the estuary is strongly opposed under any conditions by such State and Federal agencies as: California Department of Fish and Game, California Department of Parks and Recreation, California Coastal Zone Conservation Commission, U.S. National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency and U.S. Army Corps of Engineers.

4.07 VEGETATION AND WILDLIFE. The proposed project and the probable urbanization that can be expected in the flood-protected area will represent a minor encroachment on wildlife habitat. This reduction in habitat will not jeopardize the perpetuation of wildlife species because they are found elsewhere; however, the habitat loss will be another small local change in the natural community structure.

4.08 The concrete channel and energy dissipator will permanently replace 112 acres of land, with some acres providing wildlife habitat. Construction of the levees, low flow channel and sedimentation area will replace, alter or disturb the natural river channel, flood plain vegetation and wildlife habitat. The limited riparian wildlife habitat along about 7,400 feet of semi-natural and disturbed river channel will be destroyed by the project or by urbanization that occurs in the flood protected area. Water supply to the riparian habitat along the natural river channel between the boundary and Dairy Mart Road will be limited by the project to local drainage. The levees and low flow channel will replace about 30 acres of wildlife habitat and open space. Little natural habitat will be displaced as most of the native vegetation in the proposed project area has been replaced by introduced agricultural species or altered by cultivation. Most of the vegetation that will be destroyed is neither unique nor of especially high quality as wildlife habitat although it receives use by some wildlife species. An estimated 18 acres of good quality riparian habitat probably would be affected by expected future development. The north levee extension will affect an estimated 3 acres of low-quality riparian habitat. Excess excavated materials from the project will probably be used as fill in borrow pits along the Tijuana River and could affect 25 acres of land within the borrow pits; some with low to good quality riparian habitat.

4.09 The low flow earth-bottom trapezoidal channel constructed below the energy dissipator and leading to the natural channel will create a new area in which some riparian vegetation can temporarily establish between floods and provide wildlife habitat. The levees and disturbed portions of the sediment deposition area will have habitat possibilities following landscaping and reestablishment of native vegetation; however, these habitats will be vulnerable to periodic disruption from maintenance operations, or floods. The landscaped vegetative screens protecting the levees will provide about 5 acres of replacement wildlife habitat, mitigating for the permanent loss of some wildlife habitat. The landscaped habitat should provide certain wildlife species better cover and food conditions than currently exists on productive and idle agricultural land in the project area.

4.10 The impact of the proposed project on local wildlife will be minimal. The wildlife species inhabiting the area are found over most of the flood plain and are capable of thriving in regularly disturbed habitats. Some of these species are ground squirrels, burrowing owls, rabbits, mice and rats, song birds, and reptiles. Habitat for these species exists in the agricultural and open space lands adjoining the project area. Some water-associated birds will be affected by the removal of some low quality riparian habitat in the borrow pits east of Dairy Mart Road. Good quality riparian habitat with an intermittent water supply and some adjacent upland growth is downstream from the proposed project site west of Dairy Mart Road.

4.11 No endangered or threatened wildlife or plant species will be affected by the proposed action.

4.12 The animal species using the project area after construction will be mostly limited to those species that can tolerate living adjacent to urbanized and developed area. The levees, vegetative screens, and open rights-of-way will provide habitat for such species as ground squirrels, lizards, and birds. The energy dissipator will be grouted stone and dumped stone, which will preclude most vegetative growth, hence this 42-acre area will have little habitat value. Small wildlife will be able to cross the concrete trapezoidal and soft-bottom low-flow channels.

4.13 Landscaping with grasses, an evergreen ground cover, shrubs and trees will be part of the project. The soil will be stabilized and new habitat conditions will be produced. Natural vegetation will reestablish on the levees, in the sedimentation area, and in the earth-bottom low-flow channel. Natural vegetation in the sedimentation area and low-flow channel will be undisturbed until flooding necessitates sediment removal; this would be required at infrequent intervals. A detailed plan for landscaping of the project will be prepared and coordinated with the City of San Diego.

4.14 SEDIMENTATION. The sedimentation area downstream from the energy dissipator will have deposited on it an estimated 2 percent of the sediment carried by the floodflows. The remainder would be deposited in the natural stream channel, on the flood plain downstream, in the estuary, or in the ocean. Mostly coarse sediments, such as coarse sands and gravels, will be deposited in the sedimentation area; fine sands and silts will be carried into the estuary. Both the deposition of coarse materials in the sedimentation area and channel upstream from the estuary and the silting within the estuary will approximate the existing uncontrolled floodflow conditions. Although accumulating sediments over thousands of years will fill the estuary and shorten its life as an estuary, these sediments are also beneficial in providing valuable nutrients for the marine organisms. A slow rate of sedimentation is considered beneficial for the estuary, while rapid sedimentation, as occurs during major floods, will eventually fill and destroy the estuary. The estuary has historically been vulnerable to the natural process of filling with sediments and the proposed project will not change this aging process.

4.15 The proposed project will cause runoff from the Tijuana River to bypass pits that were excavated for commercial sand and gravel production. These borrow pits, which are in the flood-protected area, are near the sedimentation area and are potential sites for spoil deposition of sediments removed from the sedimentation area during maintenance operations. Also, when available sediments in the deposition area will be provided to local

interests for landscaping recreation areas downstream from the project, as fill for floodproofing of lands along the valley, and for highways, in accordance with appropriate local regulations.

4.16 VECTOR PRODUCTION AND DISEASES. The proposed action will not result in any increased vector production or vector-borne disease potential. Any ponding of water (i.e., after flooding) will be short-term, probably no greater than occurs under existing conditions. The sedimentation area will not provide any greater potential to hold standing water with a project than it does under existing conditions. When flooding occurs, water will be discharged over the 283-acre sediment deposition area; however, floodwater could discharge over this and other areas of the flood plain now without a project. Depressions scoured in the sedimentation area by flooding will be filled and the area will be levelled to eliminate ponding. It is conceivable that depressions downstream from the project along the Tijuana River valley could provide mosquito breeding habitat but this potential is less a factor of the project than of topography and drainage. The project will not adversely affect topographic or drainage characteristics and will not result in more favorable vector habitat conditions.

4.17 Standing water occurs during some rainy seasons under present conditions in the sand and gravel pits that are along about 1 mile of channel about 1/2 mile from the international boundary. The proposed action will bypass these pits, which offer the potential for mosquito breeding habitat; in the future only local drainage will empty into the isolated portion of channel. Following completion of the project and expected future urbanization of the protected area, a reduction in mosquito breeding potential in this area would be expected. In addition, proposed development of the flood protected area by the City of San Diego will involve filling of these pits, eliminating ponded water that is potential mosquito breeding habitat. A low-flow channel will bypass two sand and gravel pits downstream from the realigned Dairy Mart Road, reducing their mosquito breeding habitat potential.

4.18 The same procedures that the San Diego County Department of Health uses to minimize mosquito populations following flooding under present conditions would still be applicable with the proposed project. The limited periods of flow and ponding in the Tijuana River and on the flood plain provide a short mosquito breeding season which diminishes both the potential for large mosquito populations and the likelihood that they would be disease-carrying vectors.

4.19 OPEN SPACE. The project will change the agricultural open space used for the proposed facilities into flood control open space. Although the concrete channel and energy dissipator will have little open space value, the levees with vegetative screens, sedimentation area, earth-bottom channel and surrounding rights-of-way will be functional open space. These areas will be suitable for facilities to meet the hiking and bicycling interest of local residents. Open space in about 400 flood-protected acres in the San Ysidro corridor area will diminish as the expected urban and commercial development occurs.

4.20 Excluding the developable area and the immediate project area (totaling about 850 acres), most of the remaining 3,950 acres in the standard Project Flood overflow area is currently open space. Proposed land use plans emphasize maintaining this open space as agricultural land, estuary, State park, and recreational area. The project affords little flood protection to the lower Tijuana River valley; therefore, it complements the maintenance of open space land uses consistent with maintenance of the flood plain in a status quo condition.

4.21 ESTUARY. The exceptional resource value of the estuary was discussed in paragraphs 2.20 through 2.27. Protection of the estuary as well as other natural resources, are Federal, State and San Diego regional and city planning goals. The project will not have any direct environmental impact upon the estuary because existing runoff and sedimentation conditions will be sustained. The project neither accelerates nor slows the estuarine aging process. The estuary will receive sediments from heavy runoff or flood conditions. However, this is a natural and beneficial occurrence since sediments, and organic materials (i.e., salt marsh vegetation) are the main sources of fertilizer responsible for the unusually high productivity associated with estuarine waters. Presently, the estuary is aging very slowly because of the dry hydrologic cycle (limited flows or flooding to carry sediment into the estuary) and man's modification of the upstream watershed (i.e., dams trapping water and sediments). Estuarine plant and animal life will remain vulnerable to the natural conditions of reduced salinities during heavy runoff or floodings.

4.22 The Tijuana River will discharge into the Pacific Ocean with or without a project. Low flows will not reach the ocean because the water percolates into the flood plain aquifer, usually within 1.5 miles downstream from the border. Larger floodflows will pass through the estuary to the ocean presenting the potential for carrying any polluted water into the estuary; although, large flows will highly dilute poor quality water. Mexico has advised they will take all practical actions to avoid contributory pollution of the Tijuana River in the United States. The United States Section of the International Boundary and Water Commission will work closely with the Mexican Section to prevent or minimize water quality problems in the Tijuana River. Within the United States, the City of San Diego will be responsible for preventing unauthorized disposal and dumping of debris and refuse along the Tijuana River channel and flood plain.

4.23 GROUND WATER. The low ground water table, poor ground water quality and landward intrusion of saltwater have been caused by drought and overexploitation of the available water supply. Implementation of the proposed project will not reduce ground water recharge in the lower Tijuana River valley. Seasonal runoff and floodflows as they occur will continue to recharge the aquifers. Downstream from the project site, storm runoff and available ground water will increase slightly because of the concrete structures upstream which will preclude percolation of precipitation into the ground and prevent agricultural activity at their location. While the project slightly increases the available ground water supply downstream from the project, alleviation of the ground water problem is mostly dependent upon a return to normal rainfall conditions and reduction in the overexploitation of existing ground water by a method such as importing additional water to supply irrigation needs. The City of San Diego has proposed importing water from the County Water Authority pipeline terminus at Otay Reservoir to help meet irrigation water needs.

4.24 RECREATION. The project will permit continued recreational uses of the Tijuana River valley. The project does not provide any recreational features other than informal recreational use of the facilities designed for flood control. Development of recreational facilities in the lower Tijuana River flood plain is dependent upon the City of San Diego.

4.25 ARCHEOLOGICAL RESOURCES. As shown by an archeological and historical survey of the proposed project area, the proposed action will not destroy any known archeological or historical resources. However, the proposed realignment of Dairy Mart Road would destroy a prehistoric camp site. Destruction of this site will constitute an adverse impact on cultural resources determined to be of moderate scientific importance. To mitigate this loss, an intensive field testing survey and possible salvage of artifacts or materials from the campsite will be made by competent archeologists prior to construction of the relocated Dairy Mart Road. Further work on this site will be beneficial in that it will contribute to the presently non-existent body of data on prehistoric cultural activities in the Tijuana River area of San Diego County. The 14-acre levee extension, which was not previously surveyed, will be surveyed for archeological resources prior to any project construction. This action has been coordinated with State Historic Preservation Officer.

4.26 ESTHETICS. The concrete channel and energy dissipator that will replace idle or cultivated agricultural land will alter the landscape with obviously man-made structures. The low levees will limit the landscape view and will be visually disruptive. As currently planned, the earthen parts of the project will be landscaped to improve the visual appearance of the project. Twenty-foot-wide vegetative screens will be planted along the channelward toes of both levees, partly as a project beautification measure. Rights-of-way will be landscaped with trees and shrubs, where appropriate, to improve the appearance of the area. A plan of landscaping will be prepared and will be coordinated with the City of San Diego. The part of the Tijuana River flood plain that will be protected by the project and will be subject to residential urbanization has attractive riparian growth that probably will be replaced with cultivated urban plantings. Future urban development in the flood protected area may be affected by the project's esthetic impact.

4.27 POLLUTION. Impacts on air, and water quality during project construction will be short-term. Construction will cause increased noise levels from heavy machinery and equipment. Locally, the equipment will produce particulates and raise dust. Any storm runoff occurring during construction will cause localized soil erosion. The contractor and his subcontractors will be required to comply with all applicable Federal, State and local laws and regulations concerning environmental pollution (air, water, land and noise) control and abatement. The contractor will be monitored to assure that he will perform all work in such a manner that objectionable conditions will not be created in or adjacent to the project area. Temporary erosion control features will be included in the specification for Contractor work. Proper excavation and embankment construction procedures will be specified. Construction activities within the Tijuana River channel will be appropriately timed to avoid problems associated with the rainy season (November through March). The proposed action will result in a minor and short-term increase in air pollutants from construction equipment. Urbanization of the flood-protected area will have a slight long-term impact on local air quality. An increase in total air pollutants can be expected with expected future urbanization of the flood-protected area.

4.28 The project will not directly influence the quality of runoff water being delivered from Mexico onto the United States flood plain. However, Mexico does not intend to permit disposal of trash or other wastes into their completed channel. Mexico has initiated extension of the channel construction upstream to the confluence of Cottonwood Creek, which will further limit the use of the flood plain in Mexico by low income families and reduce the possibility of pollutants being thrown or discharged into the river channel. Such action should further minimize the potential for pollution of the United States flood plain. Fertilizers and pesticides used on agricultural lands in the Tijuana River valley will seldom reach the estuary except during flooding. With flooding these potential pollutants would be highly diluted and considering the excellent tidal flushing action within the estuary, their impact on the estuary would be insignificant.

4.29 **IMPACT ON THE ECONOMY.** Project expenditures of an estimated \$12,900,000 for land acquisition and construction costs will have a short-term impact on the local economy. Employment opportunities will be provided and local suppliers of construction materials will benefit. If the City of San Diego implements its plans for the valley, the local economy will indirectly receive long-term benefits from the recreational, urban, and commercial developments that will result. Initially, urban development will have the short-term effect of contributing to the building industry. The recreational and commercial developments will have long-term benefits because they will contribute funds to the area, thus paying for the services and facilities necessary to meet long range public needs.

4.30 With the proposed plan, the flood protected areas will likely be a net supplier of tax revenues to the local economy. The commercial and industrial centers along I-5 would provide a surplus of tax revenues over the service costs to the City and County through property and sales tax. Residential development would be self-supporting or near self-supporting because the intensity of development will create a high assessed value per acre, and the newness of the improvements would mean maintenance costs for the facilities will initially be low.

5. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

5.01 About 454 acres comprised of idle and active agricultural land, river channel, flood plain vegetation, and wildlife habitat will be altered, disturbed, or permanently displaced by the project. This will constitute a partial loss of the existing open space and an alteration of the landscape. The northern flood-protection levee will isolate a large area of channel and riparian habitat. Urbanization and development to be permitted by the City of San Diego in the flood protected area will eventually replace about 400 acres of open space, natural vegetation, and wildlife habitat. Project construction will temporarily increase local noise, air, land, and water pollution. The fact that the project does not provide flood protection to the entire flood plain indirectly affects some people adversely, either from the aspect of experiencing property losses due to floods or being unable to sell developable land at high prices.

5.02 The proposed action neither protects the estuary from natural flooding nor makes it more vulnerable to natural flooding; consequently, the Tijuana Estuary still may be adversely impacted by major floods, such as occurred during 1916.

5.03 MITIGATION. A design feature of the project is the inclusion of a facility to divert accidental discharges of sewage from the flood control channel during dry weather periods. Small volume, poor quality water flows within the flood control channel will be intercepted and diverted into the City of San Diego's sewage system for treatment. This facility will prevent dry season contamination of the flood plain in the U.S. by infrequent and inadvertent flows of polluted water coming from Mexico via the Tijuana River, representing an improvement over existing conditions.

5.04 A mitigative design feature of the project specifies the construction and landscaping of vegetative screens. This design feature will serve three purposes: (a) protect the levees, (b) enhance the appearance of the project area, and (c) provide about 5 acres of wildlife habitat to mitigate for some of the habitat permanently removed by construction of the project.

6. ALTERNATIVES TO THE PROPOSED ACTION

6.01 The Tijuana River flood control study initially considered two basic alternatives to the proposed plan for solving the potential flooding problems and meeting international agreements: (a) channel improvements and (b) a combination of dams and channel improvements. Studies indicated that any one of several damsites considered would regulate less than one-fourth of the drainage area and that the cost of flood-control storage could not be justified by the small reduction in peak flows through the lower Tijuana River valley. Because of these factors, because Mexico would need a channel under any alternative and had initiated its construction under international agreement, and because there is no apparent environmental benefit, alternatives involving dams were not considered further. The channel improvement approach for solving potential flood problems involved two basic alternatives: (a) full channelization from the international boundary to the ocean, and (b) partial channelization, starting at the international boundary and terminating about two miles from the ocean. Flood plain management and "no action" alternatives were also considered, as was the alternative of minimal structural work coupled with flood plain management (the proposed plan).

6.02 The full channelization alternative considered seven variations of the basic plan of a channel from the international boundary to the ocean. The plans varied according to type of channel (concrete-lined or earth-bottom) and alignment along the valley (along the southern edge of the valley or along the existing unimproved streamcourse near the middle of the valley). The partial channelization alternative considered construction of a concrete-lined channel from the boundary, terminating about two miles from the ocean. Although the alignment, width, and type of construction varies among these variations each has a number of common environmental impacts which are summarized in the following paragraphs. Specific impacts are discussed later under each alternative plan:

6.03 The direct consequences of the full and partial channelization alternatives are:

- a. The reduction of flood hazards in the lower Tijuana River Valley.
- b. The discharge directly into the sea of floodwaters and the sediment load carried by these floodwaters rather than into the estuary, for those alternates which discharge to the ocean, thus irretrievably altering the natural estuary ecosystem.

c. The stimulation of the economy by the construction of a \$26 million to \$60 million project within the area.

d. The commitment of land required for the channel construction.

e. The reduction of runoff water supplied to the bed of the Tijuana River and adjacent flood plain; and, for those alternatives which are concrete-lined channels, a reduction in ground water recharge.

f. The creation of a 350-to 1,400-foot-wide structure 5-miles-long, landscaped along the margins. The structure would limit north-south access across the valley to a few points, and would alter the scenic appearance of the valley.

6.04 The indirect consequences of construction of the structural alternatives result from urbanization and associated developments that would occur in the area protected from floods. The indirect consequences, which vary between alternatives depending upon the extent of the area protected from floods, are:

a. The elimination of a major barrier to urban development of the flood plain by affording flood protection.

b. The elimination of a deterrent to the development of a marina in the estuary by affording flood protection.

c. The stimulation of the local economy, resulting from the construction of the project itself and the urbanization made possible by the provision of flood protection.

d. The cost of additional municipal services with urban development of the area; i.e., schools, utilities, streets, parks and recreational areas, and police and fire protection.

e. The conversion to other types of development of cultivated and vacant land which presently provides extensive areas of open space.

f. The loss or alteration of natural and semi-natural wildlife habitats in and adjacent to the bed of the Tijuana River.

g. The loss or deterioration of aquatic and wetland habitats in all or part of the estuary, depending upon the alternative and the land use limitations imposed.

h. The loss or deterioration of habitat in the estuary area for a number of rare and endangered species, and perhaps loss of the endangered species.

i. A redistribution in location of a portion of the present and future population of San Diego County, thus redistributing the emission of air pollutants.

j. Discharge of street runoff from the future developed area into the estuary with a possible adverse effect on the salt water species habitat.

6.05 The annual benefits and annual charges for the various structural alternatives were calculated assuming the valley urban developments described in the 1967 Border Area Plan, but excluding benefits for about 1,100 acres of State Park and Tijuana Estuary lands. Each alternative, with its annual benefits and charges are given in subsequent paragraphs. With the implementation of the city's proposed 1976 Tia Juana River Valley Plan, none of the structural alternatives considered would be economically justified.

6.06 FULL CHANNELIZATION ALTERNATIVE. Seven plans for the full channelization flood control alternative were analyzed. These plans are discussed in detail in the following paragraphs.

6.07 PLAN A. This is the original plan and the plan recommended in the April 1971 draft environmental statement prepared by the Corps of Engineers for the IBWC (pl. 4). The plan would continue the Mexican channel with 5.3 miles of concrete, trapezoidal channel along the southern alignment from the international boundary to the ocean. The trapezoidal channel would have a base width of 230 feet for the segment extending 3.9 miles westward from the boundary, widening to 310 feet for the remaining 1.4 miles to the ocean. The plan would also include a structure to divert up to 30 c.f.s. of floodflows to a spreading basin for ground water recharge. Levee heights ranging from 20 to 27.5 feet would control an internationally-agreed-upon design flood of 135,000 cfs. The channel structure would occupy 310 acres; and the planned spreading basin would require an additional 120 acres of the riverbed and flood plain, extending from the international boundary to Dairy Mart Road. The estimated cost of the project would be about \$35,600,000. Equivalent annual charges, including \$2,186,001 for amortization and \$35,000 for maintenance are \$2,221,000. Equivalent annual benefits are estimated to amount to \$2,389,000. The costs and benefits were computed in 1976 dollars, based on an interest rate of 6-1/8 percent.

6.08 This plan would protect about 4,370 acres of flood plain in the lower Tijuana River valley. By reducing the flood hazard, a major barrier to the rapid urbanization and development of the valley would be removed. About 1,350 acres currently subject to land use constraints would be available for urbanization under this plan. Commercial and industrial activity would be along Interstate-5, with residential development centering around a proposed marina in the western portion of the valley. Population in the valley eventually would be over 20,000. The expected urbanization of the flood plain would reduce the natural and seminatural wildlife habitats in and adjacent to the existing Tijuana River. Aquatic and wetland habitats in all or part of the estuary would be jeopardized by possible development. Urban development in the estuary environs and watershed would hasten the rate of sediment flow and subsequent aging of the estuary. However, this plan could be developed with the area between 19th Street and the ocean retained as a natural preserve. The estuary would no longer receive freshwater inundation and alluvial sedimentation; however, little freshwater and sediment have flowed into the estuarine area during the past two decades. The flood control channel would act as a barrier to movements of the larger animals that inhabit the adjacent foothills south of the estuary. Ground water replenishment in the valley probably would decrease, resulting in a further deterioration in ground water quality. The scenic appearance of the valley would be altered.

6.09 Elimination of periodic flooding of the lower Tijuana River valley would adversely affect agricultural land uses. Flooding has the beneficial effect of leaching salts from the surface layers of the soil, fertilizing the soil by the flood-deposited materials, and increasing the ground water supply. However, with this alternative the agricultural lands would be converted to urban developments contemplated in the Border Area Plan.

6.10 The City of San Diego's land use plan (Border Area Plan) proposed urbanization and development of the lower Tijuana River valley in conjunction with the Plan A flood control channel. They have reconsidered this land use plan and now wish to maintain an open space flood plain. Since a flood plain management program is now proposed, only a minimal flood control project was desired. Plan A was not selected by the City of San Diego because it failed to satisfy their revised regional and general plan goals of conserving unique natural resources (the estuary), open space, and farmlands, and because of its the high costs (ref. 7). Also, this plan would not satisfy the environmental planning goals of State and Federal agencies. While the alternative would meet the international agreements with Mexico, for flood control, and protect existing life and property in the Tijuana River flood plain, it would not guarantee protection to the Tijuana River estuary and surrounding wildlife habitats. Plan A would encourage urbanization of the flood plain, which would be necessary to justify the high costs of this alternative; it does not meet the present local objective of maintaining the Tijuana River valley in open space land uses.

6.11 Plans A-1, B, and C, discussed in following paragraphs, are essentially the same as Plan A. These plans were not selected initially as Plan A best met the objectives at that time, and were rejected now for essentially the same reasons that Plan A was rejected.

6.12 PLAN A-1. This plan would be the same as Plan A, except that the downstream end of the channel, the 1.4 miles from Goat Canyon to the ocean, would be a 700-foot-wide earth-bottom trapezoidal channel with grouted-stone side slopes (pl. 5). This alternative has essentially the same beneficial and adverse environmental effects as Plan A except rights-of-way requirements would be greater. The earth-bottom channel would have the environmental advantage of allowing low natural vegetation to reestablish within the channel, thus providing some wildlife habitat. Also, some recharge of the ground water aquifer would occur near the ocean. The 700-foot-wide earth-bottom channel would result in a greater loss or disturbance of open space vegetation, and wildlife habitat than a concrete channel. The estimated cost of construction would be about \$36,230,000. Equivalent annual charges, including \$2,225,000 for amortization and \$35,000 for maintenance, are estimated at \$2,260,000. Equivalent annual benefits are estimated to amount to \$2,419,000. The costs and benefits were computed in 1976 dollars, based on an interest rate of 6-1/8 percent.

6.13 Plan A-1 would satisfy our international agreements with Mexico and provide protection to life and property on the Tijuana River flood plain. City of San Diego land uses in the lower Tijuana River valley would provide open space, recreation and housing. This plan would not provide protection to or preservation of the Tijuana River estuary and wildlife habitats or encourage retention of the lower Tijuana River valley for agriculture and other open space uses. Because this plan does not satisfy present regional and general plan conservation goals, and because of its high costs, the City of San Diego did not select this plan (ref. 7).

6.14 PLAN B. This plan would be essentially the same as Plan A, except that the concrete channel would be alined along the northern edge of Border State Park at the ocean (pl. 6). Plan B would cost about \$36,400,000. Equivalent annual charges, including, \$2,235,000 for amortization and \$35,000 for maintenance, are estimated at \$2,270,000. Equivalent annual benefits are estimated to amount to \$2,372,000. The costs and benefits were computed in 1976 dollars, based on an interest rate of 6 1/8 percent.

6.15 This plan would also allow development over a major portion of the valley (2,962 acres). It would create isolation problems for the portion of the valley between the channel and the international boundary. Development costs would be higher, and public services and utilities would be more expensive to introduce and maintain than with Plan A.

6.16 The channel would cut through part of the estuary and the edge of the State Park. The environmental damage to the estuary would be significantly greater under this alternative than under Plan A. The adverse environmental impacts on the estuary would consist of destruction of wildlife habitats by excavating and filling; blocking of tidal flow to the estuary; and reduction of the tidal prism, thus endangering natural scouring of natural estuary entrance and precluding tidal circulation and flushing within the estuary.

6.17 The plan would provide flood protection to existing life and property within the Tijuana River flood plain and satisfy our international agreements with Mexico; however, it would not meet city planning objectives of preserving the integrity of the Tijuana Estuary and agricultural and open space uses of the flood plain. For these reasons, and because of the high cost, this plan was not acceptable to the City of San Diego (ref. 7).

6.18 PLAN C. This plan, also essentially the same as Plan A, provides for a 230-foot-wide concrete trapezoidal channel along the middle alignment (the existing channel) (pl. 7). Plan C would cost about \$38,300,000. Equivalent annual charges, including \$2,352,000 for amortization and \$40,000 for maintenance, are estimated at \$2,392,000. Equivalent annual benefits are estimated to amount to \$2,352,000. The costs were computed in 1976 dollars, based on an interest rate of 6-1/8 percent.

6.19 Plan C would provide flood protection that would allow development of 2,941 acres of the flood plain. This plan would have serious environmental effects on the estuary. Although the adverse impacts on the estuary would be about the same as those resulting from Plan B, the severity of the impacts would be greater because the channel would cut through a larger part of the estuary. This plan would divide the valley reducing flexibility in land-use potential, and increasing development, public service and utility costs. This plan protects life and property on the flood plain and satisfies our international agreements with Mexico but does not retain agricultural and open space land uses of the flood plain or preserve the estuary. The City of San Diego did not find this plan acceptable because of its high costs and its failure to conserve unique natural resources (ref. 7).

6.20 PLAN D. This plan would provide for an earth-bottom trapezoidal channel with grouted stone side slopes along the middle alignment (pl. 8). A channel 230 feet wide connecting the Mexican channel at the international boundary would pass through an energy dissipator, and would transition to a 700-foot-wide earth-bottom channel with grouted-stone slopes. Plan D would cost about \$40,200,000. Equivalent annual charges, including \$2,468,000 for amortization and \$67,000 for maintenance, are estimated at \$2,535,000. Equivalent annual benefits are estimated to amount to \$2,236,000. The costs and benefits were computed in 1976 dollars, based on an interest rate of 6-1/8 percent.

6.21 Plan D would provide flood protection to about 4,211 acres of land, of which 2,821 acres could be developed. This alternative would have the environmental advantages of allowing recharge of the underground aquifer and permitting natural vegetation to reestablish within and along the channel. Also, wildlife habitat that would be eliminated by

a concrete channel would reestablish in the earth-bottom channel. As compared with a concrete channel, the earth-bottom channel would result in a slightly greater disturbance or loss of open space, vegetation, wildlife habitat, and agricultural land because about 15 additional acres of land would be required. Also, for high velocity flows, the earth-bottom channel would be less desirable than a concrete channel. Seawater intrusion further landward into the valley could be expected with the earth-bottom channel because saltwater would follow the channel gradient landward. This would further impair ground water quality. In addition, this plan would divide the valley and thereby reduce flexibility in its potential land use. This alternative would cause environmental damage to the estuary through excavation and filling and destruction of vegetation. In addition, the south arm of the estuary would be blocked off, decreasing the tidal prism. The environmental damage to the estuary would be even greater than those plans specifying a channel along the southern alignment.

6.22 This plan would satisfy our international agreements with Mexico and protect existing life and property on the flood plain. Land uses of the flood plain would include urban development, recreation and open space. Plan D was not selected by the City of San Diego because of the adverse environmental consequences, especially to the estuary, failure to conserve farmlands in the valley, large rights-of-way requirements, and high costs(ref. 7).

6.23 PLAN E. This plan would provide an earth-bottom trapezoidal channel, with revetted stone side slopes and four stabilizing drop structures, along the middle alignment to the ocean (pl. 9). A 500-foot-long trapezoidal concrete channel, with a base width of 230 feet, would connect with the Mexican channel at the international boundary and then transition through an energy dissipation structure to the 1,440-foot-wide earth-bottom channel extending about 4.8 miles to the ocean. This plan would cost about \$59,550,000. Equivalent annual charges, including \$3,657,000 for amortization and \$68,000 for maintenance, are estimated at \$3,725,000. Equivalent annual benefits are estimated to amount to \$1,838,000. The costs and benefits were computed in 1976 dollars, based on an interest rate of 6-1/8 percent.

6.24 This plan would satisfy our international agreements with Mexico and protect about 3,820 acres of flood plain land, allowing development of 2,410 acres. Plan E would require more acres of right-of-way than the concrete channel of Plan A. Plan E would destroy, alter, or disturb 391 more acres of land than would the earth-bottom channel in Plan D. It would also provide a larger area of channel bottom for reestablishment of vegetation, however, flooding and maintenance operations would periodically remove this vegetation. This plan would not adversely affect ground water recharge. Adverse impacts of Plan E include the removal of a large acreage of agricultural land from productivity, significant adverse effects on the estuary, and the division of the valley resulting in a reduction in its potential land-use cohesiveness. Plan E was not selected because of the severe environmental impacts, large rights-of-way requirements and high costs (ref. 7).

6.25 PLAN H. This plan is a modification of Plan A to provide flood protection to the portion of the valley east from 19th Street, and maintain the area between 19th Street and the ocean as a park and natural preserve. This plan provides for a 230-foot-wide concrete trapezoidal channel running from the boundary along the southern alignment for 2.35 miles, discharging through an energy dissipator and terminating onto the natural flood plain at 19th Street (pl. 10). A levee would extend north from the energy dissipator about 6,000

feet to high ground, protecting the valley east of 19th street from backwater inundation. An earth-bottom trapezoidal pilot channel 230-foot-wide, without levees, would carry the more frequent flows of up to 5,000 cfs along the southern alignment 2.20 miles to the ocean. The plan would also include a structure to divert floodflows to a ground water spreading basin (about 120 acres) near the international boundary for ground water recharge. Plan H would cost about \$26,370,000. Equivalent annual charges, including \$1,619,000 for amortization and \$53,000 for maintenance, are estimated at \$1,672,000. Equivalent annual benefits are estimated to amount to \$1,691,000. The costs and benefits were computed in 1976 dollars, based on an interest rate of 6-1/8 percent.

6.26 This plan would provide flood protection for about 2,258 acres of land, allowing development of land east of 19th Street. The right-of-way requirements would total 481 acres, including 120 acres in the present river channel needed for water recharge facilities. The earth-bottom channel from 19th Street to the ocean would revegetate and have wildlife habitat values; whereas the concrete channel would not. The estuary and surrounding maritime area (about 2,061 acres west of 19th Street to the ocean) would not receive freshwater inundation and alluvial sedimentation during large floods; however, sufficient flows would continue to provide beneficial nutrient contributions. The beneficial aspects of this plan include: protection afforded the estuary through slowing its natural aging by diverting flood-conveyed sediments, ground water recharge; reduced rights-of-way requirements, large acreage afforded flood protection, and provision of a 2,000-acre park and estuary area as a natural preserve. An adverse environmental effect of this plan would be the expected urbanization of the upper valley which would reduce available open space, agricultural land, wildlife habitat and natural vegetation. The City of San Diego did not find this plan acceptable because its costs were higher than the proposed plan and because it would not preserve the upper portion of the flood plain for agricultural land uses (ref. 7).

6.27 PARTIAL CHANNELIZATION ALTERNATIVE — PLAN F. This alternative, which would follow a middle alignment near the existing river channel, would be a 230-foot-wide concrete trapezoidal channel that would terminate at 19th Street, about 2 miles from the ocean (pl. 11). Floodflows would be discharged through an energy dissipator at the end of the channel and released into the lower Tijuana River valley. Wing dikes constructed across the flood plain would protect the upper valley from backwater inundation. Plan F would cost about \$27,260,000. Equivalent annual charges, including \$1,674,000 for amortization and \$54,000 for maintenance, are estimated at \$1,728,000. Equivalent annual benefits are estimated to amount to \$1,899,000. The costs were computed in 1976 dollars, based on an interest rate of 6-1/8 percent.

6.28 The alternative would provide flood protection to about 2,473 acres of land in the lower Tijuana River valley. Development would occur in the valley east of 19th Street; west of 19th Street the area would remain as open space and estuary. The plan has the lowest right-of-way requirement (261 acres) among the various channelization plans analyzed; however, the environmental impact on the estuary would be particularly severe for this alternative. The channel would terminate east of the estuary and would discharge floodwater and the contained sediments into the estuary. The discharged floodflows would kill many estuarine organisms that cannot tolerate sustained submergence in freshwater. The high velocity floodflows would destroy many of the estuarine habitats. Rapid deposition of fluvial sediments by two or three major floods might fill the estuary completely.

6.29 This alternative was not selected by the City of San Diego because it failed to satisfy their regional and general plan goals of conserving unique natural resources, open space, and farmlands. While the alternative would meet the requirements of the international agreements with Mexico for flood control and would protect existing property and lives in the lower Tijuana River flood plain, it would not guarantee protection to the Tijuana River estuary and surrounding wildlife habitats. This alternative would encourage urbanization of the flood plain (which would be necessary to justify the alternative's high costs); consequently, the plan fails to meet City of San Diego objectives of maintaining the lower Tijuana River valley in open space land uses (ref. 7).

6.30 NO ACTION. Failure to provide a project would abrogate existing international agreements and would require Mexico to construct an energy dissipator within the City of Tijuana similar to that proposed in the proposed plan. This structure would require the use of several hundred acres of developed land within the City of Tijuana. A "no action" alternative would not permit Mexico to develop its flood plain according to its planning concept, and would require extensive modification of new developments under construction or planned in Tijuana. It would require the addition of levees along the boundary to prevent backwater flooding in Mexico. The "no action" alternative could not be considered because of prior international agreements.

6.31 FLOOD PLAIN MANAGEMENT. The City of San Diego proposes to follow a flood plain management approach to land use in the lower Tijuana River valley as part of its proposed plan. The city proposes flood plain zoning that will insure passage of floodflows with minimum danger to life and minimum damage to property.

6.32 The City of San Diego currently has three flood plain zone categories available. These include: (a) a flood channel zone, which preserves a right-of-way for flood control channel construction; (b) a flood plain fringe zone, which controls development on land subject to periodic inundation; and (c) the floodway zone, which preserves an area sufficient to pass a 100-year frequency flood. Zoning of lands within the City of San Diego would affect an estimated 2,350 acres located in the floodway zone and about 680 acres located in the flood plain fringe zone for the lower Tijuana River valley.

6.33 Limited development of the lower Tijuana River valley presents the opportunity to apply flood plain management. With or without a project, flood plain management will be necessary to achieve desired protection of life and property. Much of the flood plain under the jurisdiction of the City of San Diego is currently zoned for agriculture. This land use is compatible with a lack of flood protection. City proposals to retain agricultural and open space uses of the lower Tijuana River valley flood plain amount to a program of flood plain management.

6.34 FLOOD INSURANCE. The City of San Diego is participating in the Federal Flood Insurance Program. Under regulations adopted by the city to comply with the Program, construction within the 100-year flood plain is restricted to development within the flood plain fringe, provided it is filled to above the 100-year protection level. Structural development cannot be added in the floodway zone. Participation in the Program allows landowners to apply for flood insurance at a subsidized rate. Flood insurance is required as a condition of receiving any form of Federal or Federally related financial aid for acquisition or construction purposes in an identified flood area having special flood hazards.

6.35 COMPARISON OF ALTERNATIVES. The proposed plan will provide a flood control system that will: (a) be the only structural alternative consistent with the City of San Diego's Environmental and land-use planning goals and objectives for the lower Tijuana River valley, allowing uses such as agriculture and recreation for most of the flood plain that is not afforded flood protection and it would maintain existing conditions in the Tijuana Estuary and most of the associated wildlife habitats; (b) allow a greater ground water recharge than other structural alternatives, thus helping to preserve the existing flood plain ground water supply; (c) cause some permanent loss, disturbance, or alteration of limited wildlife habitat in about 180 acres of the immediate project area, which would be less than for other structural alternatives; (d) cause less short-term air, water, land, and noise pollution during project construction than other structural alternatives; (e) encourage urbanization in a smaller flood protected area than other structural alternatives, resulting in limited reduction in open space and wildlife habitat; (f) result in less alteration of the natural landscape in the project area than other structural alternatives; (g) satisfy the requirements of the international agreement with Mexico, which are to allow Mexico to complete its channel to the international boundary, and to prevent backwater flooding into Mexico, as would each of the structural alternatives; (h) reduce floodwater velocities coming from Mexico's concrete-lined channel into the United States to what they would have been under natural conditions, the same as the channelization structural alternative plans; (i) provide flood protection to about 400 acres of land in the United States, and enable planned urbanization on flood protected land, which would be less than the longer channel structural alternatives which would protect from 2,258 acres to 4,370 acres; (j) have a smaller stimulation of the economy of the area by the construction of a \$14 million project in contrast with costs of other structural alternatives ranging from \$26 million to \$60 million; and (k) not provide increased flood protection to the City of Imperial Beach provided by the channel to the ocean structural alternatives. However, it would not increase the flood threat to that city in any way.

7. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01 FLOOD PROTECTION. Implementation of the project will provide flood protection to lives and property in a small part of the lower Tijuana River valley. The long-term impact will involve the potential for development of the protected area. The attitudes toward urbanization of the lower valley, as set forth in the 1967 Border Area Plan, have changed considerably since the April 1971 draft environmental statement. Protection of the estuary and preservation of open space have become major priorities. Because local government desires to minimize the financial burden of flood losses and developmental costs, the project will be consistent with the City of San Diego's plans to restrict land uses to those consistent with maintaining the environmental integrity of the flood plain. The flood plain management attitude of the City of San Diego should perpetuate long-term productivity of flood plain resources which are becoming scarce due to population increase and related development. The project will not promote urbanization of the lower Tijuana River valley. Instead, it will encourage multipurpose flood plain management which emphasizes protection of the estuary, maintenance of agricultural land uses, development of recreation, and preservation of open space.

7.02 OPEN SPACE. The project will result in a loss of 112 acres of the available open space in the project area. Recognizing that open space lands with recreational potential are necessary for expanding populations with free time, the city's concept is to maintain open space and to encourage development of recreational facilities and opportunities in the lower Tijuana River valley. Because of the small loss of open space as a result of the project, the long-term benefits should be similar with or without the project.

7.03 AGRICULTURE. Although the project will remove some agricultural land from use, it should also end land speculation which has discouraged intensive agricultural uses. Retaining agricultural land around the City of San Diego is desirable because open space and nearby access to fresh produce would be provided. Presently, cultivation of this area is viewed as a short-term effort because of the drought, the saline buildup in the soil, high taxes, and high labor costs. Incentives to farmers to intensify production by technological means, additional irrigation water, and an end to the drought, could mean a reestablishment of productive agricultural land use with long-term benefit.

7.04 POLLUTION. Development of the area protected by the project will increase air pollution locally; however, the limited number of urban and commercial sources should increase pollution only slightly. A short-term increase caused by vehicles probably will occur until air quality control measures are fully implemented. On completion of the entire project in Mexico and the United States, solid waste and water pollution reaching the lower Tijuana River valley from sources in Mexico will be minimal.

7.05 ESTUARY. The project will not change the normal aging process for the estuary. If sedimentation jeopardizes the long-term productivity of the estuary, then some solution, such as dredging, might be applied. However, dredging has the effect of destroying marine organisms which may not reappear for several years. Because the estuary has survived natural flooding in the past, it probably can survive natural flooding again, without remedial measures.

8. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

8.01 The project would commit 454 acres of river channel and idle or productive agricultural land for project construction and flood protection. Flood protection provided to about 400 acres of flood plain would permit extensive development and urbanization resulting in an irreversible land use commitment.

9. COORDINATION

9.01 Coordination for a flood control project for the lower Tijuana River valley started in February 1963 with a meeting of representatives from the City of San Diego, the California Department of Water Resources, Corps of Engineers and the IBWC. In 1966, the United States Commissioner, International Boundary and Water Commission was authorized to conclude an agreement with appropriate officials of Mexico for the construction of an international flood control project. This agreement was made in Minutes No. 226 and No. 236 of the Commission, which were approved by both Governments.

9.02 1971 DRAFT ENVIRONMENTAL STATEMENT. A draft environmental statement for the originally proposed flood control project was submitted on April 12, 1971, to Federal, State, and local agencies, citizen groups and individuals. Notice of availability of the statement was also published in the Federal Register. The following agencies and private groups commented on the statement:

Soil Conservation Service, USDA
National Marine Fisheries
Service, USDC
Bureau of Mines, USDI
Bureau of Outdoor Recreation, USDI
Bureau of Reclamation, USDI
Bureau of Sport Fisheries and
Wildlife, USDI
Geological Survey, USDI
National Park Service, USDI
Eleventh Naval District, USN
U.S. Department of Health,
Education and Welfare

U.S. Department of Housing and
Urban Development
Environmental Protection Agency
The Resources Agency, State
of California
California Regional Water Quality
Control Board, San Diego
San Diego County Comprehensive
Planning Organization
San Diego County Department of
Sanitation and Flood Control
City of San Diego
Citizens Coordinate for Century III

9.03 Some of the substantive comments concerned: (a) the effect of the proposed project on the estuary; (b) the consideration of alternatives, such as an earth-bottom channel or an energy dissipator; (c) the effect of the proposed project on ground water; (d) the environmental impacts on land use of the proposed action; and (e) the channel's forming a physical or psychological barrier for residents and wildlife. Comments varied as to whether or not the flood protection benefits of the proposed project outweighed the environmental damages caused by project implementation.

9.04 The environmental issues produced a reevaluation of the proposed project. Coordination between the Corps of Engineers, the IBWC, the State Resources Agency, and the City of San Diego identified the environmental issues involved and produced land use recommendations for the lower Tijuana River valley. Using these recommendations and considering the City of San Diego's plans, the IBWC and the Corps of Engineers formulated the project proposed in the draft environmental statement coordinated in May 1974.

9.05 1974 DRAFT ENVIRONMENTAL STATEMENT. The 1974 draft environmental statement was sent to all agencies, groups and individuals known to have interest in the proposed action requesting their views and comments. Their comments are summarized in the following subparagraphs and their letters of comment appear in the Appendix.

a. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.

Comment: EPA suggests that maps be included in the EIS showing the 100-year flood plain and the Standard Project Flood. The inclusion of this material will assist in the assessment of the environmental impact of the proposed project.

Response: The project location map (plate 1) has been modified to show a 100-year and standard project flood line in the Tijuana River valley study area. The 100-year flood and standard project flood would inundate about 4,400 and 4,800 acres, respectively. The differences between the overflow lines are imperceptible on the map used in this report.

Comment: On page 8 of the EIS, there is a discussion on the considerations of the "California Protected Waterways Plan" for protection and preservation of the Tijuana River Estuary: (1) What is the status of bill No. S. 1964 (presented in Congress June 7, 1973)? (2) What is the likelihood of the inclusion of the Tijuana River Estuary in the National Registry of Natural Landmarks? (3) Will this proposed project bias or jeopardize the potential for national protection and preservation at the Estuary?

Response: Bill No. S. 1974, introduced in Congress by Senator John Tunney on June 7, 1973, to preserve the Tijuana Estuary has been indefinitely shelved by the Senate Caucus Committee. The significance of the National Registry of Natural Landmarks is the actual designation of a natural area for inclusion in the National Registry rather than registration. Registration of such sites on the National Registry requires agreement by the landowner or landowners to preserve the significant natural values contained in the site although no land use rights or privileges are relinquished. A spokesman for the National Park Service stated in a telephone conversation that if there is only one owner they try to register the site; however, where more than one landowner, or many are involved, as with the Tijuana Estuary, they have not usually attempted to register the site because of the complications. Thus, it is unlikely that the Tijuana Estuary will be registered in the National Registry of Natural Landmarks under present conditions, but this is less important than its eligibility for inclusion in the Registry. The proposed action will not jeopardize the potential for national protection and preservation of the Tijuana Estuary. A portion of the estuary is already part of Border State Park, the site has been designated a National Natural Landmark (although not registered), and the State legislature has provided funds to purchase about 400 acres of private lands at the mouth of the estuary. The proposed project will maintain the Tijuana River valley below the proposed project in a status quo condition and will not encourage development that will jeopardize the estuarine environment or any of the pending Federal or State preservation actions.

Comment: EPA suggests that more information be presented on the Tijuana River Estuary. Such discussion should be expanded, but not necessarily limited to include the following:

a. Will the project increase or decrease the sediment accumulation rate in the estuary? It is stated on page 18, (paragraph 81) that, "The project will not have any direct environmental impact upon the estuary because . . . existing runoff and sedimentation conditions will be sustained." Yet, on page 17 (paragraph 76) it is stated, "Although accumulating sediments fill the estuary and shorten its life as an estuary . . ."

Response: The proposed project does not significantly affect the natural rate of sediment accumulation in the estuary. The statement that the project will not have any direct environmental impact upon the estuary is correct. The energy dissipator is designed to slow the velocity of floodflows being conveyed by the concrete channel to conditions that would occur without the project, prior to release of flows into the natural river channel. The

change in sediment load conveyed by the channel will not be significantly different than under pre-project conditions. The river will continue to carry sediment from above and below the project and these sediments will continue to fill the estuary and shorten its life. The natural process of sedimentation of the estuary has been going on for thousands of years and will continue. The proposed action will not speed or slow this natural process.

The evolution of any estuarine system is characterized by natural sedimentation. In the case of the Tijuana Estuary, natural aging (filling with sediments) occurs when sediments enter the estuary from normal runoff and during flooding. Rates of sedimentation vary according to rainfall, runoff, and man's modifications of the watershed. The normal cycle of estuarine aging has been highly modified by man's activities. Three dams control runoff in the mountainous areas feeding water into the Tijuana River. The dams limit both runoff and sediments that can reach the estuary. In addition, the climate has been an important factor limiting the transport of sediments into the estuary. A lack of significant runoff or flooding since 1944 has been responsible for less sediment reaching the estuary than under normal hydrologic conditions. Under present conditions, it would appear that the rate of aging for the estuary is very slow. Any changes in the rate of estuarine aging are related to land use activities, mostly above the project, and the climatic cycle rather than to project induced changes.

Comment: Paragraph 81 suggests that there will be an increase in deposition of "...fine sands and silts..." in the estuary. In an attempt to understand the impact of this increase, it is suggested that information be presented on tidal action: (1) What is the tidal prism range of the estuary and (2) are the tides adequate to accommodate the increase in sediments through tidal scour?

Response: Paragraph 76 states that fine sands and silts will be carried into the estuary approximating the existing uncontrolled floodflow conditions. In agreement, paragraph 81 states that the project will not have any direct environmental impact upon the estuary because existing runoff and sedimentation conditions will be sustained. Although these statements and subsequent statements do not appear to give the impression that the project will cause an increase of sediments entering the estuary, additional statements clarifying this point have been added to the environmental statement.

The following information is presented about tidal influence in the Tijuana Estuary. The estuary is connected with the ocean by an opening through the beach. Except for a 3-6 month period in 1961, the estuary mouth has remained open during the last 20 years. Sand-moving processes constantly threaten the existence of the estuary entrance. Tidal flushing is the most important factor in scouring the wave deposited sands from the entrance channel. The flushing action that cleans deposited sediments from the restricted estuarine mouth depends on the volume of the tidal prism, which is a function of tidal range and estuarine area. The average flushing rate is probably about 500 acres feet (ref. 20) per tidal cycle. It appears that the tidal prism (volume of water within the estuary between mean high tide and mean low tide) for each tide has a volume estimated to range from 100 to 3,000 acre-feet depending upon the tidal range throughout the fortnightly tidal cycle. The rates of flow through the estuary entrance are probably greatest during periods immediately preceeding and immediately following peak spring tides. The tidal flow is minimal during mean tides. During the extreme spring tides, an estimated 1,100 acres of the estuary and salt marsh may be flooded. At mean tide level the water area of the estuary is

probably in excess of 100 acres and during daily high tides 500 to 600 acres of the estuary and salt marsh are probably flooded (ref. 20). Since the flushing action within the estuary has kept the entrance open with only one exception during the last decade, it appears that any accumulated sediments are being removed from the estuary. In fact, the maximum ebb flow from the estuary may result in a net seaward transport of sediment from the estuary. Thus, the tidal prism is adequate to remove accumulating sediments that might block the channel entrance and jeopardize the estuarine habitats.

In addition to tidal action, freshwater flows into the estuary can move sediments into and out of the estuary; however, freshwater flows into the estuary have been relatively insignificant since the early 1940's (the total annual rainfall on the estuary normally does not exceed 1,100 acre feet for the entire 1,100-acre estuary). Consequently, the removal of substantial volumes of sediment from the estuary is the result of tidal flows.

Comment: What is the quality of water in the estuary? It is suggested that information be presented on nutrient levels, salinity and dissolved oxygen ranges.

Response: The periodic exchange (twice daily) of water between the estuary and sea has preserved the marine character of the estuarine water; consequently, salinity and temperature values, and concentrations of oxygen, nutrients and other dissolved constituents have remained similar to those found in the adjacent coastal waters (ref. 20). Studies completed for the Corps of Engineers by Ocean Science and Engineers, Inc. (ref. 20) between October and December 1970 showed that salinities within estuary tidal channels were close to those normally observed for nearshore waters on the outer coast. The salinities in the estuary tidal channels varied from a low of 8.5 parts per thousand (ppt.) following 1.46 inches of rainfall in December to a high of 35.8 (ppt.) in October (no rain). The average salinity of seawater is 35 ppt. Samples taken at different levels within a tidal channel on October 14, 1970 showed salinity variabilities of 33.01 ppt. at high tide on the channel edge to 40.62 ppt. on the channel center bottom at low tide (ref. 20).

Salinities decline markedly in parts of the estuary during and following significant (heavy) rainfall. Thus, some organisms inhabiting the estuary are subject to changes of at least 23 ppt. over short periods of time. However, the ocean influence returns salinities to near normal levels within a very short period of time.

The saturation value for dissolved oxygen (DO) along the open coast is 8 milligrams per liter (mg/l). The DO levels for satisfactory growth and survival for marine fishes is between 5.3 and 8 mg/l. In the Tijuana Estuary, the DO level infrequently may drop to 4 mg/l for a limited period. Because of the excellent tidal flushing action, DO levels are usually high (6-8 mg/l) throughout the estuary. No published data are available concerning nutrient levels in the estuary but some data provided by personnel from Scripps Institute of Oceanography at La Jolla indicate low nitrate, phosphate and ammonium levels within the estuary.

Comment: To what degree is the importation of water for irrigation contingent on the project, i.e., what is the status of the city's proposal vis-a-vis the proposed project?

Response: The water importation program will be applicable only with a project which will permit continued agricultural uses in the valley.

Comment: With the possible importation of water, to what extent will nutrient-rich agriculture return flows affect the Estuary?

Response: It is unlikely that nutrient-rich agricultural irrigation return flows would reach the estuary under most conditions. Most agricultural land that is currently irrigated or probably would be irrigated under the water importation program, is located east of 19th Street. Agricultural irrigation return flows presently percolate into the underground aquifer prior to reaching the estuary. In February 1975, the Corps of Engineers discussed agricultural return flows with personnel from the California Water Quality Control Board, and biologists from Scripps Institution of Oceanography and the University of San Diego that have studied the Tijuana Estuary; no data or information were provided that indicated that irrigation water that might cause water quality problems was presently reaching the estuary. Only during exceptionally heavy runoff periods or flooding would nutrient-rich water be likely to reach the estuary and it would be highly diluted by the flows. Such events have been rare in the last 30 years and could not be considered as significant contributions to eutrophic conditions within the estuary.

Comment: On page 8 (paragraph 34) the statement is made that, "Great volumes of fresh water. . .will kill many salt water species in the estuary. . ." Is there a history of these kills?

Response: This statement is based upon the knowledge that freshwater is lethal to most marine animals, and that heavy freshwater flows into estuarine areas kills many marine species, especially non-mobile or sedentary invertebrates (ref. 25). There is no documented history of saltwater species being killed during flooding in the Tijuana Estuary but it is assumed that when major floods occurred in the past (i.e. 1916 and 1937), the volume of freshwater reaching the estuary was sufficient to kill marine invertebrates. This effect was not necessarily widespread throughout the estuary but perhaps occurred locally. Various arms of the estuary may have escaped any adverse effect. In addition, fine sediment carried by the flood water probably smothered many marine invertebrates not already killed by the freshwater. Data obtained between October 9, 1968 and March 4, 1969 by San Diego State University ecology classes indicated that heavy rainfall occurring in the winter-spring of 1968-1969 eliminated marine invertebrates such as sand dollars and snails from limited sections of the estuary.

Comment: In paragraph 41 (page 10) the comment is made that, ". . . developers, investment groups, and speculators presently own all but 200 acres of the flood plain." The EIS indicates that there are 4,800 acres in the SPF plain. The land use breakdown on page 10 shows approximately 2,600 acres occupied by the estuary, Naval Air Station, State Park, and urban, public and commercial facilities. Therefore, it is difficult to understand the "200 acre" figure.

Response: The land use section has been revised to clarify the existing situation.

Comment: It is stated on page 12 that, ". . . no sanitary sewers will discharge to the Tijuana River . . .": What is the expected level of treatment for the sewage, and where will the effluent be discharged?

Response: Mexico is designing a secondary treatment plant for the City of Tijuana. Its construction will eliminate the discharge of untreated wastes to the ocean. The effluent presently discharges to the ocean about 5.5 miles south of the U.S. Mexico border. Effluent from the new treatment plant will be used for irrigation and industrial purposes in Mexico southeast of the City of Tijuana.

Comment: The EIS indicated (paragraph 75) that, "Slightly less sand will reach the ocean to aid in beach sand replenishment." What is the expected amount of reduction of sand for beach replenishment?

Response: The environmental statement has been modified to reflect that the net sediment transport capability of the Tijuana River remains essentially unchanged with the project. The sentence that slightly less sand will reach the ocean to aid in beach sand replenishment has been deleted.

Comment: What percentage of sand from the Tijuana River affects sand replenishment at Imperial Beach?

Response: No precise technical data are available to indicate what percentage of beach replenishment sand at Imperial Beach comes from the Tijuana River. Historically, the Tijuana River was the principal source of sediment (ref. 24) for the Silver Strand littoral cell (mouth of Tijuana River to the mouth of the San Diego river). Based upon measurements and historical records, the annual sediment load of the Tijuana River to the coast has been estimated at an average of about 700,000 cubic yards per year. The sediment load of the river is mostly sand and gravel with lesser amounts of silt and clay. Insignificant flows in the Tijuana River, especially since 1944, have resulted in a failure to replenish the beach with sand; consequently, the littoral currents in the vicinity of the river mouth have eroded the beach (Imperial Beach). Several large sand and gravel excavation pits along the old river bed may act as very effective sediment traps and even with heavy flows or flooding would trap a large quantity of beach replenishment material.

Comment: EPA suggests reconsideration be given to the utilization of the borrow pits for potential spoil deposition of sediments removed from the sedimentation area during operation and maintenance (paragraph 78). If the sediment prove to be primarily sand, it is conceivable that this material may be used for beach replenishment.

Response: Sediments trapped in the sedimentation area will probably include a mixture of sand, gravel, silt and debris. If this material were conveyed to the shoreline by natural processes, it would contribute to beach replenishment. However, if artificial placement of the same material on the beach were proposed, the Regional Water Quality Control Board, the Environmental Protection Agency, and other regulatory agencies would likely classify the material as unsuitable for deposition on the beach. In addition, the cost of transporting this material to an area such as Imperial Beach would be prohibitively high. The spoil material will be made available to local interests as fill for proposed recreation areas, flood proofing of lands, and highways.

Comment: On page 19 (paragraph 85) the statement is made that, "... storm runoff ... during construction will cause localized soil erosion." EPA suggests that there be discussion on mitigating measures for this problem to minimize possible adverse environmental effects.

Response: The environmental statement has been modified to include information about measures employed to minimize or prevent environmental pollution during construction of the project.

b. ADVISORY COUNCIL ON HISTORIC PRESERVATION.

Comment: To insure a comprehensive review of historical, cultural, archeological, and architectural resources, and, in accordance with the August 1973 comments and recommendations of the California State Historic Preservation Officer, the Advisory Council suggests that the final environmental statement contain evidence of contact with Mr. Ronald May, Society for California Archeology, California State University, San Diego, California 92115.

Response: Mr. Ronald May completed a field survey of the proposed project site in September 1974. No historical or archeological resources, artifacts or features were located within the proposed project area. The section on Historical and Archeological Resources in the environmental statement includes a summary of his findings.

c. UNITED STATES DEPARTMENT OF THE INTERIOR.

Comment: We suggest the current Bureau of Sport Fisheries and Wildlife reference "Threatened Wildlife of the United States," 1973 edition, be cited in the final statement. In addition, the State of California now lists Belding's savannah sparrow as an endangered species.

Response: The environmental statement has been modified to include this information.

Comment: The description of black rail habitat states that the bird is entirely dependent upon the salt marsh. We feel this statement should be modified. Black rails have been observed inhabiting inland fresh water marshes on the lower Colorado River.

Response: The statement has been modified to reflect that the black rail, if it still exists in the area, would be dependent upon the salt marsh habitat around the Tijuana Estuary since there is very little freshwater marsh habitat. It is acknowledged that salt marshes and inland freshwater marshes provide habitat for black rails; however, freshwater marsh habitat is almost nonexistent around the Tijuana Estuary since there are rarely any freshwater flows in the river.

Comment: Paragraph 37 and page 9 mentions the endangered species that inhabit the estuary and adjacent areas. Paragraph 73 states that no rare or endangered plants and animals use or are located in the project area. This appears to be contradictory and should be clarified. Since the project area and the estuary are only approximately 3 miles apart, an explanation of why the project area is not used by the endangered species of birds should be discussed.

Response: With the possible exception of the peregrine falcon, which was last observed in the lower Tijuana River valley in December 1975, the threatened wildlife species mentioned are primarily associated with the estuarine or salt marsh habitats. No salt marsh, freshwater marsh or other habitats suitable for the nesting or feeding requirements of the endangered species mentioned are located within the proposed project area. Consequently, it is highly unlikely that any of these species would occupy the highly disturbed agricultural, old field and disturbed river bottom habitats that occur in the proposed project area, which is about 3 miles east of the estuary and salt marsh habitats.

Comment: We suggest the final statement provide more substantive information regarding the project's impact upon historical and archeological resources, and thus allow assessments of these aspects of the project itself and of the alternative described in the statement. The information on the archeological resources should be documented. We recommend that a survey of the area be made by a professional archeologist to identify and evaluate the archeological resources present. The findings and recommendations of the archeologist who performs the survey should be included in the final statement.

Response: The proposed project area was surveyed by archeologist Ronald May, as suggested by the August 1, 1973 Department of Parks and Recreation letter, and no historical or archeological resources were located within the proposed project area. The survey findings and archeologist's recommendations are included in the environmental statement.

Comment: The statement mentions that sediment in the bottom of the energy dissipator would possibly be deposited in borrow pits that were excavated for construction of Interstate 5. Disposal of the soil should be described in more detail plus potential spoil sites other than the borrow pits.

Response: A detailed discussion about disposal of the sediments from the sedimentation area and potential spoil disposal sites is not realistic at this time since the quantity and quality of the sediments will be unknown until flooding has occurred. At such a time, the Federal Government, which will be responsible for maintenance of the sedimentation area, will provide the material to local interests, in accordance with local State and Federal requirements.

Comments: In our examination of the sand and gravel pits located downstream from the area to be protected, areas used for dumping of refuse, no doubt illegally, were discovered. Floodwater directed into the natural channel from the low flow channel will carry this accumulated trash downstream. This is a definite source of pollution that threatens the marine environment and the Tijuana River estuary. The final statement should contain a discussion of this potential pollution hazard, its possible degrading effect on downstream habitat, and suggested preventive measures.

Response: The final environmental statement has been modified to discuss the pollution of the Tijuana River channel in the United States and the potential impact of trash and debris being carried into the Tijuana River estuary by floodflows. The right levee will prevent floodflows from entering the borrow pits upstream of Dairy Mart Road. The low flow channel will bypass the large borrow pit area downstream from Dairy Mart Road.

Comment: The discussion of adverse environmental effects that cannot be avoided does not adequately describe possible adverse impacts to the Tijuana River Estuary if a major flood occurs. Possible adverse impacts should be discussed in detail.

Response: The section on adverse environmental effects that cannot be avoided should the proposal be implemented has been modified to reflect that natural flooding will adversely impact the Tijuana Estuary. However, such an impact is not project-related because natural flooding will not be significantly increased or decreased by the proposed action. Also, a discussion of the effects of natural flooding on the estuary occurs in the environmental statement under the Tijuana Estuary.

Comment: The Department of the Interior recommends that a section dealing with mitigation and protective measures included in the project be added to the statement. All environmental protective measures incorporated into the project should be discussed along with any mitigation for irreplaceable losses incurred by the project. The June 26, 1974 letter of comment on the draft environmental statement by the Department initially suggested a monitoring study of possible adverse impacts to the Tijuana River estuary be implemented as a mitigative measure. In a letter to the IBWC, dated May 10, 1976, the Department of Interior suggested formulating a plan to remove as much debris as possible from the flood plain as an alternative mitigative measure.

Response: The adverse environmental effects section of the environmental statement discusses measures that will be utilized to reduce adverse environmental consequences of the proposed project and mitigation for irreplaceable losses. The Federal Government, as part of its maintenance program for the sediment deposition area, will periodically maintain the sediment deposition area, as mentioned in paragraph 1.11.

d. ELEVENTH NAVAL DISTRICT.

Comment: Flight operations at the Naval Air Station, Imperial Beach are expected to continue for the foreseeable future. In order to ensure the integrity of flight operations, the Navy has acquired approximately 664 acres of land to the east, south, and west of the station and has outleased a 283-acre parcel of this acquisition to the State of California for a wildlife sanctuary. Further, the Navy made available to the State of California approximately 378 acres of land to the south of the Air Station for park purposes. The State is currently negotiating to acquire the privately owned property lying between these two parcels in order to develop Border State Park. This facility will no doubt become a very valuable public asset.

Response: The environmental statement has been modified to reflect the correct acreage of land acquired and leased by the State of California from the U.S. Navy.

e. CORPS OF ENGINEERS, SOUTH PACIFIC DIVISION.

Comment: The Bureau of Sport Fisheries and Wildlife and the California Department of Fish and Game have prepared a cooperative report entitled "Acquisition Priorities for the Coastal Wetlands of California" dated April 1974. This report places the Tijuana River Estuary in acquisition priority A for coastal wetland acquisition. This report should be referenced.

Response: The environmental statement has been revised to reflect this comment.

Comment: The California black rail is not on the most recent (10-73) Federal Endangered Species list although it is on the State list. Therefore, the reference to the black rail as being on both the Federal and State lists should be corrected. The proper terminology in the Endangered Species Act of 1973 (P.L. 93-205) is "Endangered Species" and not "Rare and Endangered." This terminology should be corrected accordingly.

Response: The environmental statement has been modified to correct the terminology.

Comment: The 1 August 1973 letter from the State Historic Preservation Officer recommends that those areas outside State jurisdiction be reviewed by professional archeologists in the field to make certain that historical, archeological, and paleontological values are not unnecessarily damaged or destroyed. He further recommends that Mr. Ronald May of the Society for California Archeology be contacted. If this has been accomplished, it should be documented in this paragraph. If not, steps should be taken to coordinate with Mr. May and have those areas outside State jurisdiction reviewed by professional archeologists in the field.

Response: Mr. Ronald May has been contacted and the findings of his survey on historical and archeological resources of the proposed Tijuana River project area are included and referenced in the environmental statement.

Comment: The statement that less sand will reach the ocean after the project is constructed is not consonant with the penultimate sentence of Paragraph 81. The energy dissipator is to reduce the high velocity flows from the upstream improved channel to the uncontrolled velocity levels of the present natural channel. Thus the net sediment load transport capability of the river emptying into the ocean is essentially unchanged.

Response: The statement that less sand will reach the ocean with construction of the project has been deleted in concurrence with this comment that the net sediment load transport capability of the river emptying into the ocean is essentially unchanged.

Comment: It should be indicated on what the information contained in tables 3 to 10 are based.

Response: A paragraph has been added to the vegetation and wildlife section of the environmental statement identifying the sources of the data provided in tables 3 to 10.

Comment: The location of the two river gauge stations and the references wells should be shown on the plate for added clarity in understanding the changes in river discharges with distance downstream and variations in the ground water levels relative to the ocean.

Response: The environmental statement has been modified to show the location of the two river gauge stations and the wells referenced in Tables 1 and 2.

Comment: In the absence of an accompanying design memorandum, or an engineering design analysis, concurrence in the recommended plan is limited to concept only.

Response: An engineering design analysis will be prepared and reviewed prior to releasing the proposed project for contract bidding.

f. STATE OF CALIFORNIA.

Comment: The project will have little direct impact on fire protection and forest, range and watershed resources. However, the condition of the Tijuana River watershed will have a major impact on the project. We suggest that the EIS address the question of the watershed's condition in the section on the Environmental Setting and wherever else appropriate in other sections of the EIS. It should be recognized that this watershed has been subject to frequent and extensive wildlife, particularly in Mexico. This pattern is likely to continue.

Response: It is acknowledged that the condition of the watershed influences the quantity of flows and sediments carried in the Tijuana River. However, it would take a very unusual combination of circumstances within the watershed before the project would be significantly affected. Water conservation reservoirs control about 71 percent of the watershed. Because Colorado River and California Water Project water is available for use in San Diego County, these reservoirs are kept at minimum storage levels so they have a greater than normal capacity to hold floodflows and trap debris and sediments. Those subareas without reservoirs are a minor part of the watershed. The Hydrologic Engineering Section of the Corps of Engineers has indicated that fires which burn a few thousand acres would not change the standard project flood peak discharge. The watershed is large, about 1,700 square miles, has limited vegetative cover, and is controlled by reservoirs; fires would have to burn a large portion of the watershed before any significant effect would occur during a large flood. Rodriguez Dam in Mexico would stabilize the effect of increased runoff and debris following a fire in that area. Localized fires occurring in the watershed west of Tecate or downstream from the area controlled by the dams might increase runoff and sedimentation during small floods (5 to 10 year magnitude). There would be no significant impact on the function of the dissipator under these conditions.

Comment: Paragraph 49, page 11, states that "the possibility of flood runoff including domestic sewage is minimal. . . limited to flood borne contributions from rural area." This is incorrect. Sewage from Tecate, Mexico, flows down Tecate Creek to Cottonwood Creek, thence to the Tijuana River. If the flood control channel is extended to the Tecate River at its confluence with Cottonwood Creek, the Tecate sewage discharge could easily flow down the impervious channel to the United States.

Response: The comment that sewage flows down Tecate Creek to Cottonwood Creek at other than flood times is not correct. It is acknowledged that a small quantity of raw sewage from Tecate, Mexico flows into Tecate Creek; however, this effluent does not reach the Tijuana River. Only under flood conditions would sewage from this source reach the floodplain in the United States and then it would be highly diluted. Mexico has completed and will soon have in operation a primary sewage treatment plant at Tecate and with this

plant in operation raw sewage no longer will empty into Tecate Creek. The Mexican Section of the International Boundary and Water Commission has assured the United States Section that domestic sewage will not be emptied into either the impervious channels or natural drainageways that flow into the Tijuana River.

Comment: In the City of Tijuana, chronic problems with overflowing, broken sewer lines result in sewage discharges to the Tijuana River. These sewage discharges to the river result in contaminated water, possible health hazards, and general degradation of water quality in the United States. If these discharges should reach the Tijuana Estuary in significant volume, they may contribute to eutrophication and reduce the oxygen resources in the estuary. Nutrient materials in the waste may cause algal growths which are detrimental to the marsh habitat for aquatic life.

Response: Problems of broken sewer lines in Mexico which historically allowed sewage discharges to the Tijuana River have occurred infrequently. Agencies of Mexico have moved to correct this situation and eliminate the problems of raw sewage emptying into the Tijuana River and reaching the United States. No data exist that show sewage has reached the Tijuana Estuary, creating any problems of high eutrophic levels. Water quality data for the estuary are very limited but show low levels of phosphates and nitrates (indicators of eutrophication) and normal levels of oxygen. The planned low flow interceptor will largely resolve this potential infrequent discharge of sewage into the United States. Improvements to the sewer system in Tijuana have been and are being made, and additional work is planned. *Mexico has given responsible assurances to correct any situations that cause water quality problems within the United States.*

Comment: Since this is a Federal project which will involve site disturbance, the sponsors should be aware that compliance is required with Executive Order No. 11593, "Protection and Enhancement of the Cultural Environment." The final EIS should further identify possible archeological sites in the areas that would be impacted by construction. The results of this survey, along with the name and professional affiliation of the persons conducting the survey, should be included in the final statement. According to Mr. William Penn Mott's letter of August 1, 1973, to the Los Angeles District of the Corps of Engineers, a field review by professional archeologists should be undertaken to ensure this protection, although there appeared to be no adverse effect on known historical and archeological values. This particular point has not been dealt with in the draft EIS.

Response: An archeological and historical survey of the proposed project area was completed by a professional archeologist as recommended in Mr. William Penn Mott's letter of August 1, 1973. The survey findings are included in the final environmental statement.

g. CITY OF SAN DIEGO.

Comment: It would be appropriate that the EIS also discuss more completely the extent to which the proposed project and each alternative meet the goals and objectives of Federal, State and regional government.

Response: The environmental statement has been modified to reflect this comment.

Comment: In paragraph 9 it is stated that "... local interests will be responsible for the sediment deposition area". This responsibility should be clarified. It is the city's understanding that this paragraph refers to responsibility as outlined in a letter dated February 6, 1973, from Commissioner Friedkin of the IBWC to Mayor Wilson of the city, as follows: "City would be required, under the authorization by the Congress, to either furnish the rights-of-way for sediment deposits or indemnify the Government against any such damage suits. If the area is to be acquired by the City for a golf course or other public use, as indicated in the Preliminary Concept Plan, the United States needs could be satisfied without acquisition for rights-of-way for sedimentation. The City would also need to furnish such areas as may be required for disposal of sediments from the flared section of the channel. "No decision has yet been made regarding the City's maintenance and operation responsibilities in the sedimentation area."

Response: The final environmental statement has been corrected to state that project operation and maintenance will be by the Federal Government.

Comment: The total acreage under State Park management is 670 acres, not 655 acres as presented in paragraph 54.

Response: A spokesman for the Department of Parks and Recreation stated 684 acres are currently (May 1976) under State Park management.

Comment: It should be mentioned in the land use section, (paragraph 70) that Brown Field, to the east of the project area, is being considered for future development as an International Airport. If the proposed airport facilities were constructed, the Tijuana River Valley would be in the flight path of aircraft from Brown Field. Retention of the valley for agriculture and recreation as proposed in this project would provide more compatible uses in the noise zones of aircraft operations than would the intense urban development that would be permitted by the other flood channel alternatives.

Response: The environmental statment has been modified to include this information.

Comment: The project would provide 430 flood protected acres in the San Ysidro corridor area, not 370 acres as stated in paragraph 79.

Response: The environmental statement has been modified to reflect a slight change in the project requested by the City of San Diego whereby flood protection will be provided to about 400 acres in the San Ysidro corridor area.

Comment: The proposed project would allow continued recreational uses in the Tijuana River Valley. In addition, the City of San Diego currently proposes the development of three neighborhood parks, with a total of approximately 20 acres, adjoining the proposed project area.

Response: The environmental statement has been modified to reflect these comments.

Comments: A more precise description of the proposed landscaping should be included in the esthetic impact section. Landscaping should be provided in accordance with the City of San Diego Land Development Ordinance.

Response: A detailed landscaping scheme will be completed and coordinated with the City of San Diego.

Comment: The designation of a neighborhood park and elementary school south of Monument Road on Plate 3 is incorrect and should be deleted.

Response: The most recent land use plan proposed by the City of San Diego, as shown in the January 1976 Tijuana River Valley Plan and Environmental Impact Report, is shown in Plate 3.

9.06 The following governmental agencies reviewed the 1974 draft environmental statement and either made no comments or suggested no changes:

Federal

U.S. Department of Agriculture

U.S. Coast Guard

U.S. Department of Health, Education and Welfare

U.S. Department of Transportation, Federal Highway Administration

Office of Economic Opportunity

Local

Comprehensive Planning Organization of the San Diego Region

9.07 CITIZEN GROUPS AND INDIVIDUALS. The January 1974 draft environmental statement was sent to all citizen groups and individuals known to have an interest in the proposed action. The comments of the responding citizen groups and individuals are summarized in the following subparagraphs, and their letters of comment are included in Appendix A.

a. PACIFIC LEGAL FOUNDATION.

Comment: The Pacific Legal foundation questions the sufficiency of the draft statement on two bases. First, it would seem difficult to provide the precise and balanced analysis required by NEPA until the recommended project design is completed. We are informed the recommended project design is still at a tentative stage and are therefore uncertain that the major cost-benefit factors to be balanced have been considered in the draft statement.

Response: The present analysis has been made in detail sufficient to verify costs, benefits, and environmental impacts. Additional detail is not warranted at this stage of project evaluation.

Comment: We note that discussion of the levee system is limited to paragraph 7 (c) on page 3 of the Statement and the drawing provided on plate 2. Neither the discussion in paragraph 7 (c) nor the drawings in plate 2 contain sufficient technical data to allow a realistic appraisal of the system's effectiveness by an expert. It is suggested, therefore, that more design detail be included to describe the levee system.

Response: The present analysis has been made in detail sufficient to verify the project features. Additional detail is not warranted at this stage of project evaluation. A detailed engineering design analysis is prepared before any proposed project is constructed, and this procedure would be applicable to this project.

Comment: It would appear that due to the erodable nature of the soils in the area that the levees should be reinforced.

Response: The levees will be designed with revetment in areas where scour is anticipated. The depth of revetment at the levee toes will be determined after detailed hydraulic analyses have been made during the final design stage, prior to construction of the project. Also, 20-foot-wide landscaped vegetative screens along the inside toe of each levee will provide additional protection from scouring floodflows.

Comment: There is an indication in plate 2 that there will be some riprap protection on the side slopes of the levees. Data as to the depth of the riprap is not provided however. (This would appear to be an important factor to an expert who would be evaluating the effectiveness of the plan.)

Response: As stated previously, depth of riprap protection will be determined after more detailed design analyses have been accomplished. It is true that this is an important factor.

Comment: There is some doubt that reliance on riprap for protection of earth levees against floodwaters is justifiable. See the March 1974 issue of Civil Engineering-ASCE at pp. 68-70 (attached), wherein there is a discussion of the Mill Creek, Lytle-Cajon Creeks and Banning Levee projects in the California counties of San Bernardino and Riverside. It was concluded in the Civil Engineering article at page 70 that "recent experiences demonstrate the inadequacy of non-rectilinear soft-bottom flood control channels in this (Southern California) area and particularly those on steep alluvial cones." The Tijuana River Valley reportedly slopes from fifty feet above sea level to sea level in five and one-half miles and therefore apparently qualifies as a "steep slope" area. The possibility of the earth dike or levees breaching under flood conditions with cross channel or diagonal flowage or parallel flowage along embankment toes is thus raised. It is kept in mind that there can be no assurance that the flood flows emerging from the dissipator will spread uniformly across the river delta. The composition of the proposed dikes or levees together with the information regarding earth dikes in other southern regions of the State, thus justify raising the possibility of failure. In keeping with the purpose of the Draft Statement and in the interest of insuring that the optimally beneficial action is taken, it is suggested that the design regarding the levee or dike system be considered and that any increased costs due to another mode of reinforcement (e.g., steel sheet piling) be set out in the final impact statement. In the alternative, if there is no modification of the levee design, it is suggested that the risks and dangers involved in the present design be evaluated and discussed in the final statement.

Response: This exact question, with accompanying supportive data, was asked IBWC in a letter dated 24 June 1974 from Mr. L. E. Cramer, President of Cramer Corporation, to Commissioner Friedkin of the United States Section of the International Boundary and Water Commission. The Corps of Engineers has designed and constructed many projects with similar levee systems which have functioned efficiently under flood conditions. In addition, the United States Section has for many years successfully constructed and maintained over 400 miles of similarly-designed levees along the flood plain of the Rio Grande. Concerning the references to the article in the March 1974 issue of Civil Engineering, the Corps of Engineers, Los Angeles District, which performed the work described, finds that the conditions in the example areas are not comparable with those in the Tijuana River valley. The Tijuana River valley floor in the area of the project has a slope of 50 feet in 5.5 miles, which is a slope of about 0.2 percent. The streambed grades at the Banning, Mill Creek, and Lytle Creek levee projects range from 4.5 to about 3 percent. Thus, flow characteristics in the Tijuana River would differ markedly from those in the streams at the project described in the magazine article. Therefore, we can not agree with your concern about the design of the levees.

Comment: The recommended plan provides that floodwater and sediment will pass through the channel and dissipator and will discharge into the unprotected lower Tijuana River Valley. It must be expected, therefore, that the sedimentation area and the rest of the flood plain will, from time to time, be covered with pools of stagnant water. (Numerous depressions and pockets characterize the topographic configuration of the Tijuana Valley.) The statement does not consider the effects of this condition on the environment. It is submitted, however, that the ponds of stagnant water will provide excellent breeding grounds for the encephalitis-carrying mosquito which has already been identified in the Border Field area. (See San Diego Union, March 18, 1973, page B.3.) Dr. J. B. Askew, San Diego County Health Director, has stated that all that is required for the encephalitis virus to spread throughout the area is an increase in the mosquito population. The ponds in the flood plain area could potentially provide the breeding ground for the increased mosquito population which could make the virus a real threat to the surrounding population. The seriousness of the potential adverse effects flood plain ponds may have on the environment is thus realized even in the very narrow context of the mosquito problem. Further consideration and evaluation of this problem and other problems created by the vast flood plain is thus warranted in the final draft statement.

Response: A section covering vector production and vector-borne diseases has been added to the environmental statement.

Comment: We also note with concern the inadequate and conclusory nature of the discussion of the water and solid waste pollution aspects of the project.

Response: The section in the environmental setting on water and solid waste pollution has been revised to incorporate new data and information that clarifies the existing situation. In addition, the impact section concerning pollution has been modified to reflect the conditions that can most reasonably be expected to prevail with the proposed project.

Comment: It appears that the statement on page 12, "(a) no sanitary sewers will discharge to the Tijuana River, and the sewer system is being expanded, the possibility of flood runoff including domestic sewage is minimal and limited to flood borne contributions from rural areas", is subject to dispute and based largely on expected actions on behalf of the Mexican government.

Response: The Mexican government has provided assurances that they will not allow domestic sewage to discharge into their concrete-lined channel. Mexico has a record of taking action to remove causes of any contamination of water entering the United States. Mexico took action in the early 1960's to construct its own sewage disposal works to guard against pollution of the California beaches, including Imperial Beach. In 1965, the United States Section arranged for (and Mexico pays on a "use basis" for) emergency discharges of Tijuana sewage discharges to the San Diego disposal system for protection of United States interests. Mexico is designing a secondary treatment plant and is continuing to improve its Tijuana sewage collection and disposal system. It plans to eliminate discharges to the ocean. Mexico has completed works at Tecate to guard against any raw sewage from that city entering the United States. By agreements through the IBWC in 1958 and 1967, Mexico paid its part of the construction and pays its part of the annual costs for operation and maintenance of a joint sewage treatment plant in the U.S. to treat sanitary wastes from Nogales, Sonora and Nogales, Arizona. Mexico is constructing intercepting sewer collection lines along each side of the flood control channel in its country to guard against sewage inflows into the new channel. Additionally, an intake to the San Diego metropolitan sewer system will be included in the low flow channel to intercept sewage flows resulting from a break or an overflow of a sanitary sewer in Tijuana discharging through a storm sewer into the flood control channel. The U.S. Section will continue measures to avoid pollution to either country by waters from one country crossing the border into the other.

Comment: Joseph N. Barry, Environmental Specialist, California Regional Water Quality Control Board, San Diego Region, in a memorandum dated June 6, 1974, disputes the statement that the possibility of flood runoff, including domestic sewage is minimal and limited to flood-borne contributions from rural areas. He states:

"In the City of Tijuana, chronic problems with overflowing and broken sewer lines result in sewage discharges to the Tijuana River. These sewage discharges . . . presently result in contaminated water, public health hazards, and general degradation of water quality in the United States. If these discharges should reach the Tijuana Estuary, they may contribute to eutrophication and reduce the oxygen resources within the estuary."

Response: Broken sewer lines in the City of Tijuana that have resulted in sewage discharge to the Tijuana River have occurred upon occasion; however, it is not accurate to state that this is a chronic problem. Such a problem is not unique to the City of Tijuana but can occur and reoccur at any time in any city in the United States. Mexico has been responsive in correcting these situations. Effluent from these unpredictable discharges probably never travels further than about one mile downstream from the border where it is trapped in sand and gravel pits; admittedly when the discharges occur, water quality is very low (coliform counts highly exceed acceptable standards) and potential health hazards exist.

Except for short periods of time (days to several weeks), when such accidental discharges have occurred, there has been no serious or chronic pollution problem at the boundary. The project interceptor to divert accidental sewage discharges will greatly minimize the chance of sewage flows entering the Tijuana River in the United States. Only during flood conditions would potentially polluted water reach the estuary and then it would be highly diluted and less likely to contribute to eutrophication of the estuary. During telephone communication in February 1975 with personnel from the Regional Water Quality Control Board, California Department of Fish and Game, San Diego County Health Department and local universities, no information was obtained that showed that polluted water either from Mexico or the United States was affecting the quality of the Tijuana Estuary and salt marsh habitats.

Comments: It is noted further that while paragraph 49 on page 11 of the report states that Tijuana provides sewer service to most of its population, the Mexican Department of Public Works has stated that presently only forty-five percent of Tijuana is served by sewers.

Response: The environmental statement has been modified to express the most accurate estimation of the population that is served by a sewer system.

Comment: While Mexico may have programmed sewer system expansion, very little is known concerning the implementation of such plan; the facts indicate that the sewer system is inadequate to meet present needs. The possibility of flood runoff including domestic sewage, therefore, may be far greater than the estimated "minimal" and it is apparent that contributions will not be limited to rural areas. This crucial health factor warrants more detailed and factual analysis in the final statement.

Response: Mexico has worked towards improving their sanitary sewer system since the early 1960's. It is not correct to say they are not implementing expansion of their sewer system. While the system only serves 66 percent of the present population, there has not been a serious problem of frequent pollution of the Tijuana River from sewage flowage from Mexico. Although sewer line breaks have caused sewage to discharge into the Tijuana River where it has been carried into the United States, this has not been a persistent and frequent problem which has jeopardized the health of those living within the United States portion of the Tijuana River Valley. The low flow channel sewage interceptor will mitigate the effects of future sewer line breaks.

b. SAN DIEGO COUNTY FLOOD PLAIN TECHNICAL COMMITTEE.

Comment: There is an apparent omission in the list of alternatives studied as presented in the two summary pages. Plate 8 refers to a Plan D which is not described in the summary pages.

Response: The environmental statement has been modified to correct the omission of Plan D in the summary page.

Comment: In paragraph 14 it would be more accurate to describe the climate of the lower valley as subtropical steppe (BSH) rather than just subtropical, the latter term usually referring to moister climates (C type) not found in the coastal zone. Nineteen hundred and

sixty-seven and 1973 might be added to the list of years with above average precipitation in paragraph 15; these were years of above normal rainfall in downtown San Diego and probably were in San Ysidro as well.

Response: The environmental statement has been modified to reflect this information.

Comment: In paragraph 16, it might be advisable to check as to whether Pliocene sandstones really overlie Pleistocene ones. This would be a reversal of what would normally be expected, and is probably an error.

Response: The environmental statement has been modified correct this error.

Comment: It might be noted that Tables 4 and 7 represent only a partial listing of the birds found in the floodplain and estuary. In all, over 300 species have been observed there; thus, the figure of 86 in paragraph 31 is misleadingly low. If the figure of 86 refers only to nesting species, this should be so stated.

Response: The vegetation and wildlife section of the environmental statement has been revised to provide more accurate information about the vegetation and wildlife species in the lower Tijuana River valley.

Comment: We still encourage the Corps, as we have in comments to previous environmental impact statements to refrain from using the phrase "elimination of flood hazards" (on pages 20 and 22) when referring to structural alternatives. Hydrologic events in the east and midwest over the past two years should make the reasons for this clear.

Response: The alternative section of the environmental statement has been modified to include a different terminology in reference to structural alternatives providing reduction in flood hazards.

c. LARRY OGLESBY, POMONA COLLEGE.

Comment: My chief criticisms of the ecological aspects of the draft environmental statement are (1) that the tables and discussions do not really deal with the relative abundances of animal and plant species present, and (2) that there is no real discussion of biotic communities, their composition and structure. A footnote to Table 9 states that only common species are listed, but there is no indication in the text (e.g., No. 29-38) that there are sure to be many more kinds of organisms, both plants and animals, present, and that some of these are bound to be important. This problem is common to almost all environmental impact statement I have read, and not just those of the Corps of Engineers. But I do wish that some serious attention would be paid to biotic communities. While in most cases, the species comprising these communities may not themselves be rare or endangered, certainly the salt marsh community, the mud-flat community, the lowland riparian community are all endangered. The difference is important, and the situation should be addressed directly. Endangered communities must be considered along with endangered species.

Response: The vegetation and wildlife section of the environmental statement has been modified to reflect the importance of certain biotic communities in the lower Tijuana River Valley and to reflect that the species lists do not represent all species found within the area.

Comment: The Belding's race of the Savannah Sparrow has just been added to the State list of endangered species. The newly revised edition of "At the Crossroads" (California Department of Fish and Game) singles out Tijuana Estuary and Marsh as being particularly critical to the continued survival of this species which, like several others mentioned in paragraph No. 37, is entirely dependent upon the salt marsh.

Response: The final environmental statement includes the Belding Savannah Sparrow in the list of endangered species.

Comment: I should add that there is a considerable number of incorrectly spelled scientific names in Tables 3 through 9.

Response: The final statement has been carefully proofed to eliminate typing errors in the scientific names.

Comment: No justification is given for why the proposed concrete channel and energy dissipator, in total extending for nearly 3/4 mile downstream from the border, are to be placed in the specific locations indicated. Why not, for example, start the energy dissipator right at the international border? Careful placement of the dissipator here would reduce the total linear and areal extent of the project, thus preserving even more of the "excellent riparian vegetation" near Dairy Mart Road (paragraph No. 30).

Response: The proposed alignment was recommended because of the engineering requirements for this type of dissipator. The proposed channel width and length would be the minimum required to be effective as a dissipator. Because of the high velocity flows coming from the Mexican concrete channel, it is desirable to direct these flows away from the San Ysidro area and control them in the channel dissipator. The design of this recommended plan is based on a similar structure in the Walnut Creek channel constructed in Los Angeles by the Corps of Engineers.

Comment: Re-positioning the necessary north levee close to Interstate 5 and to San Ysidro would mean that far fewer than 370 acres would be lost to the flood plain. These 370 acres, it is candidly admitted in several locations in this statement, will be subject to rapid urbanization. No real justification is given for protecting these 370 acres, as yet unbuilt, "protecting" them in a way that will assure their loss as natural areas. I am no engineer, and there may well be excellent engineering reasons why, if the project is to be built at all, it must be built in this particular way and in this particular location. But these reasons are not given in this draft environmental statement, and I regard this a serious omission.

Response: Aligning the north levee near Interstate 5 would require that more land be obtained for the project and result in a project with larger costs and smaller benefits.

d. L. E. Cramer, Cramer Corporation.

A comment report on the draft environmental statement was submitted by the Cramer Corporation on August 26, 1974 to the U.S. Army Corps of Engineers, Los Angeles District. The cover letter and 15 pages of conclusions are included in the environmental statement; however, due to the length of the report, 104 pages plus index, the remainder of the text is not included in the statement. A copy of the comment report is available at the U.S. Army Corps of Engineers, Los Angeles District, 300 N. Los Angeles Street, Room 6640, Los Angeles, California 90053.

Comment: THE DRAFT ENVIRONMENTAL STATEMENT - hereinafter designated DES - for a so-called flood control project in the valley of the Tijuana River, has been prepared prematurely. The project which that DES document recommends and is largely concerned with, has not been funded or approved by the US Congress. It appears that the DES was written around - in apparent attempt to justify - a pre-determined course of action conceived for political purposes by the current Mayor of the City of San Diego. The DES "Recommended Project" (Alternative III-A) violates sound engineering principles, sound engineering judgements, sound economic principles, sound environmental principles, and appears to contribute to circumvention of the following Public Laws: (a) 91-190 - Environmental; (b) 286 - 74th Congress - Treaty with Mexico; and (c) 89.640 (1966) - authorizing flood control project in Tijuana River Valley.

Response: The proposed plan, which was modified from the authorized original plan at the request of the City of San Diego to conform to their current land use planning concept meets the objectives of the international agreements with Mexico. The environmental statement is deemed to be in compliance with Public Law 91-190. Congressional authorization will be necessary for Governmental participation in obtaining right-of-way for the proposed plan.

Comment: No sound engineering evidence, fiscal evidence, social evidence, or environmental evidence has been presented in the DES to justify implementation of the "Recommended Project" (Alternative III-A) over any other alternative to the authorized project for construction of a flood control channel from terminus of the Mexican channel to the Pacific Ocean.

Response: The rationale for the proposed action is presented in the environmental statement. The proposed action is considered the best plan to meet local, regional, State and Federal planning objectives for the lower Tijuana River valley.

Comment: The DES does not assess the dire necessity for a project that would bring control of the occasional major floodings over Tijuana River Basin and deltaic plain.

Response: No need was demonstrated for a costly flood control project to protect a nonurbanized flood plain. The City of San Diego did not request a flood control project that would provide almost complete flood protection to the valley since they did not envision an immediate need to urbanize the lower Tijuana River valley.

Comment: The proposed "Recommended Project" (Alternative III-A) is NOT a "flood control project", as is claimed and designated in the DES document. Under no stretch of the imagination can a project merit or deserve the nomenclature: "Flood Control Project", if it would result in converting to permanent flood plain a potentially desirable and useful area of 5,200 acres with the substantial intrinsic value of Fifty Thousand Dollars (\$50,000.) per acre. The final environmental Statement should delete the "Flood Control Project" delusion, and substitute appropriate terminology.

Response: A flood control project prevents or reduces damages associated with flooding. The terminology for the project is correct.

Comment: NONE of the FAVORABLE ENVIRONMENTAL IMPACTS have any real validity, nor can substantial evidence be found for any single component to render it worthwhile enough, or significant enough, to be listed an environmental advantage in a document of the type being commented on here.

Response: The listing of favorable environmental impacts was not quantified as to the degree of significance, nor was there an intent to quantify these favorable impacts, so the individual reader could make an objective evaluation of the project effects. These impacts were listed as favorable since such effects were commensurate with the desired amenities that the City of San Diego wanted to achieve by flood plain management for the Tijuana River valley.

Comment: A characteristic of the DES document is dwelling overlong on items of little or no significance in the overall process of environmental evaluation. A typical example is the emphasis here and there throughout the DES document that leaving from 370-400 acres available for so-called urbanization - out of a possible maximum of 4,500 acres (more or less), is a factor that calls for a parade of "106 trombones and 49 trumpets". The limits of environmental knowledge concerning the "Recommended Plan" (Alternative III-A), in effects, in justifiable usurpation of the existing temporary environment, and in control strategies regarding the aftermaths of implementing the "Recommended Project" are never reached in the DES document.

Response: The assessment of environmental impacts resulting from the recommended plan is considered to be as accurate and thorough as is possible.

Comment: The "Recommended Project" (Alternative III-A) - if it should ever be implemented - will bring in its wake, regional unemployment to exceed the present (Aug/74) ten (10) percent index; broken families; broken businesses; financial disaster for a number of citizens; and general human misery among those directly affected. Those impacts will be part of the permanent and disastrous legacy of the "Recommended Plan" (Alternative III-A).

Response: The project effects stated in the above comment are deemed conjectural.

Comment: Listed as ADVERSE ENVIRONMENTAL IMPACTS in the DES are: encouragement of urbanization on (only) 370-400 acres (this urbanization factor is also listed in the DES as a FAVORABLE ENVIRONMENTAL IMPACT); and smaller deposition of flood-related debris on United States floodplain due to situation and street runoff

generated in the Mexican City of Tijuana, than under pre-project conditions. A smaller quantity of debris from Mexico would be a definite **ADVANTAGE - NOT A DISADVANTAGE.**

Response: Depending upon point of view, providing flood protection that allows urbanization can be either a favorable or adverse project impact. It is a favorable impact when it allows a city to develop an area as part of their planning goals; however, along with the development is the adverse impact of reducing available open space. The summary page of the environmental statement has been modified.

Comment: Completely omitted from the list of **ADVERSE ENVIRONMENTAL IMPACTS** that would be due to the "Recommended Project" (Alternative III-A), are the following:

- a. Loss of rights of private property owners; (NOTE: Guaranteed under the United States Constitution)
- b. Costs of acquisition of flood plain lands estimated to be around **TWO HUNDRED MILLION DOLLARS (\$200,000,000);**
- c. Loss of improvements contemplated by the **SAN DIEGO 1967 BORDER AREA PLAN;**
- d. Loss of around ten thousand (10,000) construction jobs every year for around twenty five (25) years;
- e. Loss of around two thousand (2,000) permanent jobs under the completed status of the **SAN DIEGO 1967 BORDER AREA PLAN;**
- f. Loss of estimated **ONE HUNDRED and EIGHTY SIX MILLION DOLLARS (\$186,000,000.)** property tax take during first fifty (50) years of project life, and under concept of the **SAN DIEGO 1967 BORDER AREA PLAN;**
- g. Loss of enormous recreational benefits for over five (5) million people per year in the water-oriented world that would be created under the **SAN DIEGO 1967 BORDER AREA PLAN;**
- h. Loss of incalculable cultural and other highly beneficial benefits inherent in the 950-acre **INTERNATIONAL PARK** (Not a State Park), that would promote, foster, and cement international relations with the people of Mexico; (NOTE: This proposed **INTERNATIONAL PARK** is a key component of the **SAN DIEGO 1967 BORDER AREA PLAN**)
- i. Constant threat of loss of lives and property of recreationists and other using the flood plain - including users of Border Field State Park - due to flooding of the Tijuana River delta under a major runoff condition;

j. Continuation of the process now going on toward complete filling in of the Tijuana River Slough(s), and eventual elimination of the slough(s); (NOTE: There is NO estuary at the present "old" mouth of the Tijuana River)

k. Complete destruction of any crops, operating plant, irrigation water distribution systems, and other tangible property and goods, on those lands which the City of San Diego intends to induce agricultural operations in event the "Recommended Project" (Alternative III-A) should be implemented - and under flood conditions involving the 50-year, 75-year, and Standard Project Flood potentials; and

l. Pollutational inflowage from Mexican Cities of Tecate and Tijuana as well as basin side slopes between City of Tijuana and Rodriguez Dam (11 miles upstream) to include street wastes, septic tank installation seepages, and occasional raw sewage.

Response: Most of these "adverse environmental impacts" attributed to the proposed action are based upon speculations as to what would occur with implementation of the 1967 San Diego Border Area Plan and a flood control channel from the border to the ocean. While the Border Area Plan still exists, the City of San Diego has proposed a new land use plan and flood control alternative. The San Diego City Council approved on October 10, 1973 a land use planning concept for the Tijuana River valley which did not call for urbanization of the flood plain or a channel from the border to the ocean. Upon City Council approval, the 1976 Tia Juana River Valley Plan will replace the 1967 Border Area Plan. It is not relevant to address impacts that would occur with implementation of a land use plan not currently supported by the City of San Diego, which has jurisdiction over most of the lower Tijuana River valley.

Comment: The final Environmental Statement should thoroughly explore the physical, financial, and social consequences that are presently identifiable and/or estimable, of implementing the "Recommended Project" (Alternative III-A) in the Tijuana River Valley.

Response: We feel the final environmental statement adequately addresses the physical, biological, social and economic impacts of the proposed action.

Comment: The final Environmental Statement should also illustrate the great complexity of problems that will develop over the Tijuana River Valley lands if that area is NOT improved along the lines contemplated by the approved SAN DIEGO 1967 BORDER AREA PLAN.

Response: The City of San Diego developed the 1973 land use and flood control Alternatives III-A as the conceptual plan that best suited their planning goals. The 1976 Tia Juana River Valley Plan discusses the conceptual land use plan in detail and the City's preference for the proposed project. The environmental statement discusses the impacts of the proposed action and the expected future setting without a project. We do not consider discussion of the effects of a land use plan that is not currently supported by the City of San Diego as relevant to the proposed project or to the City of San Diego's current land use planning for the Tijuana River valley.

Comment: The so-called "Low Flow Channel" in the "Recommended Project" (Alternative Project), is shown in preliminary design data as 1.5 miles in length; a 230-foot-bottom width; and a design Q of 1,000 cfs. Design velocity is not indicated - but terminal velocity at the outlet end of the dissipator structure - under Standard Flood Project flows, is calculated to be twelve (12) feet-per-second. That velocity of water flow, if it entered the low-flow earth-section channel, would literally tear it to pieces. There would be no vestige of the channel remaining after the flood flowage ceased. It is thus recommended, to save the expensive restoration charges that the low-flow channel be designed as a smaller cross-sectional prism and concrete-lined. It is further recommended that the low-flow channel be re-aligned from that location indicated in preliminary design data, and follow the same centerline alignment as intended for the original full-capacity flood control channel, for the complete distance from the dissipator structure to the Pacific Ocean. It makes little sense to take the low-flow channel over to the old cut made by the 1941 Tijuana River flood, because that cut is only temporary, and any new flood exceeding 1,000 cfs Q would take a new route to the ocean. This recommendation involves extension of the low-flow channel for several miles greater distance than indicated in preliminary design data. Construction funds expended on creation of a low-flow channel as indicated in Plate 2 in the DES document, could be money wasted on a thoroughly useless facility of the "Recommended Project" (Alternative III-A).

Response: The basic design criteria of the dissipator plan is to reduce the high velocity flow from the Mexican channel to a flow condition that can be released into the flood plain without causing severe damages. The description of the reduction of velocities has been expanded in the final statement. Scouring velocity at the outlet end under the standard project flood is anticipated. Therefore, the levees and revetments are designed to withstand its effects. Scouring would largely occur in the immediate area of the outlet end. The current design of the low-flow channel will have a 50-foot base width and a trapezoidal earth section extending approximately 1.3 miles from the end of the dissipator. It will be designed to convey to the existing natural channel the normal drainage and floodflows up to 1,000 cfs. Thus, it will reduce the potential of the river to meander and cut a new course during the more frequent storms with smaller discharges. Extension of a concrete-lined low-flow channel to the ocean would not be reasonable. It would increase the construction and maintenance costs and right-of-way requirement and not add any significant benefits to the area. Maintenance of the low-flow channel is anticipated after any major flood. The bulk of the work will probably be removal of sediment and reestablishing the low-flow channel.

Comment: A serious shortcoming of the DES document concerns the already adopted and approved SAN DIEGO 1967 BORDER AREA PLAN (BAP). The BORDER AREA PLAN is significantly mentioned in the DES, but most insignificantly described. DES detailed data regarding the BAP is missing, What should be a feature of any Final Environmental Statement on the "Recommended Project" (Alternative III-A) should be complete information about the BAP.

Response: As mentioned in the environmental statement, the San Diego City Council resolution on December 21, 1971 directed its staff to review and update the 1967 Border Area Plan since they no longer supported the 1971 proposed flood control project that would allow implementation of segments of the Border Area Plan covering the Tijuana River flood plain. In response, the Planning Department developed a report entitled "Tia Juana River Valley Land Use and Flood Control Alternatives" (ref. 7). This report considered the Border Area Plan along with five other alternatives for land use and flood control in the area. Based upon an evaluation considering engineering, economic, planning, and environmental parameters, and ability to meet city and regional goals and coastal regulations, Alternative III-A (energy dissipator system) ranked first and the Border Area Plan ranked last (sixth). Readers wishing a detailed description of the Border Area Plan and other proposed land use and flood control alternatives are directed to the forementioned report. On October 30, 1973, the City Council passed a resolution selecting Alternative III-A from this report as the land use plan for the lower Tijuana River valley. The City of San Diego is currently (May 1976) circulating the Tia Juana River Valley Plan and EIR for public and agency review. City Council approval is required of this plan before the existing Border Area Plan is formally replaced. A detailed discussion of a land use plan not now supported by the City of San Diego is not deemed relevant to the proposed action.

Comment: The total amount of the funds - direct and indirect - that would be required to accomplish all the objectives of the "Recommended Project" including purchase of flood plain lands for park or any other purposes need to be spelled out in any final Environmental Statement that might be prepared for the "Recommended Project".

Response: Project costs are presented in the environmental statement. The costs to the City of San Diego for land in the valley to be acquired for proposed future land uses are not discussed since they are not project related.

Comment: The DES fails to indicate the major environmental damages that would occur in the 5,200 acre Tijuana River Valley including the existing Border Field State Park should there be an event involving the Standard Project Flood of $Q=135,000$ cfs. The DES fails to thoroughly point out the potential threats and dangers to all those present in that valley or the Park at the time of major flooding. Most certainly, these factors should be thoroughly covered in any final Environmental Statement.

Response: The proposed action slows floodwaters to velocities that would be expected to occur under existing flood conditions; thus, pre-and-post project flood conditions in unprotected areas will be unchanged. Although not project-related, flooding will damage agricultural land and equipment, a limited number of houses and structures, and the estuary and State Park. Because there are limited physical structures or development within the State Park area or estuary, damage would mostly be physical (i.e. loss of vegetation and sediment deposition). The natural environment would respond following flooding, recovering its inherent values. The agricultural land and crop and structural losses that could be expected to occur during 50 or 100 year floods are not great enough to justify the expense and environmental consequences of providing a flood control channel from the border to the ocean. There will be adequate time for persons in the valley to be evacuated at the beginning of a major flood.

Comment: Any final Environmental Statement on the "Recommended Project" should recognize the potential for eventual demand for improvements of the type contemplated under the SAN DIEGO 1967 BORDER AREA PLAN; and the best recommendation that can be made at this time, in lieu of a full flood control channel to the ocean, is that any works that might be constructed now, be part and parcel of a master plan that embraces that channel to the Pacific Ocean contained in the authorized original project, as well as optimum use of Tijuana Valley lands for purposes already outlined in the SAN DIEGO 1966 BORDER AREA PLAN.

Response: The City of San Diego selected Alternative III-A, (energy dissipator) from a variety of alternatives ranging from full urbanization of the flood plain (1967 Border Area Plan) to nonurbanization emphasizing agricultural use. The proposed plan would realize the desired local and regional objectives for the lower Tijuana River valley. The land uses contemplated under the 1967 Border Area Plan are not consistent with San Diego's current land use planning desires.

Comment: Both the Federal Government's and the State of California's departments having some responsibilities relating to fish and wildlife resources in the Tijuana River delta and slough(s) and other areas in the nation and the State, have concluded that construction of the authorized flood control channel in the delta of the Tijuana River would "have insignificant effect" upon fish and wildlife in that region (see testimony from both sources under pages 25A and 25B herein. Therefore, the final Environmental Statement should definitely embrace information regarding fish and wildlife, prepared by identified experts in their fields, who at the same time, understand economics and the needs of Mankind.

Response: The referenced letters from the California Department of Fish and Game and United States Fish and Wildlife Service were made in April and March 1963, respectively, as reviews of a Notice of Initiation of Investigation report. The statements that they made about the proposed action having little effect and insignificant effect, respectively, on fish and wildlife resources were based upon very preliminary planning data. In addition, California Fish and Game Department wished to review the final report to make appropriate comments and recommendations. While these initial statements may have reflected an insignificant effect of the proposed action on fish and wildlife resources in the Tijuana River valley, later comments by the same agencies reflected entirely different views. In comments on the 1971 draft environmental statement for construction of a flood channel from the border to the ocean, both agencies stated that project would have direct and/or indirect adverse effects upon the estuary.

Comment: The DES states that the City of San Diego rejected the authorized project-including a flood control channel-due to "economic reasons." Yet those economic reasons are not identified. The true and overall effects of NOT constructing the channel to the ocean, should be identified in any final Environmental Statement - and that should include the varied economic elements, especially including charts, tables, or whatever might be desirable to support or deny the claim by the City of San Diego, that the original channel scheme was abandoned due to "economic reasons".

Response: A discussion under the economics section of the City of San Diego's Tijuana River Valley Land Use and Flood Control Alternatives report (ref. 7) indicates that potential losses from flooding under existing conditions would not offset the long term capital expenditures for flood control improvements. Thus, the City of San Diego could not justify the cost of recovering all Tijuana River valley flood plain lands for development. The high cost of this alternative (\$35,600,000 for Plan A) was identified in the Alternatives Section. The City of San Diego stated they cannot justify this expense for recovering land for development especially in view of the availability of land elsewhere.

Comment: The DES document if finalized for Alternative III-A should certainly contain several architectural renderings to indicate the very undesirable appearance that will be manifested by: (a) Construction of the 23-foot high northerly-trending earthen embankment in such close proximity to the heavily tourist-travelled Interstate Highway 5; and (b) Construction adjacent to the community of San Ysidro and to the same Interstate Highway 5, of the huge dissipator facility with its 3,650-foot-concreted length; its 1,440-foot outlet width; and its tremendous quantity of bare rock riprap on the floor which will contain cavernous interstices to trap and harbor inflowing filth, debris from the streets and sidehills of City of Tijuana, sewage wastes etc. This will be a very definite ADVERSE ENVIRONMENTAL IMPACT due to the "Recommended Project" (Alternatives III-A) and any final Environmental Statement that might be prepared, should thoroughly document that type of impact regarding aesthetics.

Response: The environmental statement evaluates the changes in visual esthetics resulting from the proposed project, so that the reader can draw his own conclusions about the esthetic impact of the proposed action. Esthetic impacts are subjective--what is ugly to one person may be attractive to another. For this reason, esthetic impacts are not identified as either adverse or beneficial. A plan of landscaping will be prepared and will be coordinated with the City of San Diego.

Comment: If we are to take the claims of some environmentalists opposed to the authorized flood control channel for the Tijuana River Valley, in favor of the "Recommended Project", we must agree that if the latter is implemented, that would constitute an "irreversible commitment of resources". Therefore the final Environmental Statement should embrace carefully considered succinct analyses of the irreversible nature of the non-flood-control scheme upon the Tijuana River delta, and the effects it will exert on the deltaic resources such as general pollution of land and water areas; complete change of topography following major floods; eventual loss of existing slough(s); complete wipeout of vegetation; and backflooding into Mexico, etc.

Response: The lower Tijuana River valley has been vulnerable to flooding and associated physical and biological changes for thousands of years and this condition will not significantly change following the proposed project. The resource commitment remains unchanged. We see no cause-and-effect relationship between the proposed project and an irreversible commitment of resources.

Comment: The DES document does not explore the subject of overall and comparative economics between alternative project concepts. Especially should the original authorized project concept, and the proposed modified Alternative III-A concept, be shown side-by-side. These comparative economic estimations should positively embrace all estimated tax intakes over the period of project amortization including costs of essential community services to the project area; intrinsic land values; maintenance; and all other fiscal considerations - all regardless of who does what, and where funds may originate. In other words the true cost of Alternative III-A has not been indicated in the DES, nor has it been analysed fully, objectively, and without prejudice. The final document - if made - should correct these oversights. The final ES document should also be revised to include full coverage of economic comparisons and evaluations of every other alternative that has been presented in the DES.

Response: The environmental statement has been modified to show comparative economic charges and benefits for the various alternatives. The detail includes total project costs previously included in the draft EIS, average annual benefits and average annual costs. The average annual charges include interest and amortization, operation and maintenance, and loss of land productivity. Average annual benefits include flood damage prevented and increased land utilization. The section on project cost shows annual charges and benefits for the project life as well as construction costs; thus adequately reflecting the true project cost.

Comment: The DES document attempts environmental assessment of the "Recommended Project" (Alternative III-A) via element separation. All elements of an environmental assessment must be considered in various relationship to each other. In other words, considered as a chain-reacting complex. Piecemeal assessment, such as rodents alone; plants alone; fish alone; topography alone; economics alone; people alone; water alone; etc - has not resulted in this instance, in a viable overall environmental assessment that can lead to a viable overall project decision.

Response: The environmental statement follows operational procedures for implementing Section 102 of the National Environmental Policy Act of 1969, which specified that individual parameters (i.e. economics, vegetation and wildlife, water quality, etc.) must be explained objectively and in sufficient detail so the reader can evaluate the environmental impacts of the proposed action. The beneficial and adverse interrelationship of the individual impact elements have been demonstrated in the environmental statement. Piecemeal assessment commonly refers to impact assessment for only one project of many related projects proposed for an area.

Comment: Deannexation proceedings are currently under way that embrace the "Recommended Project" area, plus all remaining lands in the Tijuana River Valley, as well as some contiguous lands. Successful deannexation action can result in removing the City of San Diego from its present position of jurisdictional influence over the project area, and as a consequence, rendering consideration of any alternative to the original authorized project for a flood control channel to the Pacific Ocean, completely irrelevant. The final Environmental Statement - if ever prepared - should give some recognition to the deannexation probability and if it should be successful, there might be an opportunity to place the already approved and fully financed flood control channel under immediate construction.

Response: Some residents of San Ysidro are seeking deannexation from the City of San Diego. The San Ysidro Chamber of Commerce at the April 1976 public meeting stated they were opposed to deannexation.

9.08 PUBLIC PARTICIPATION. The IBWC, the Corps of Engineers and the City of San Diego have received input on the proposed project from private citizens and citizen groups through letters and informal contacts. The City of San Diego held public hearings on proposed land uses and flood control alternatives for the lower Tijuana River valley on July 29 and August 23, 1973. Representatives of various citizens groups, individuals and agencies presented statements and expressed their views on the recommended land use and flood control alternative for the Tijuana River valley at these times. Various individuals and citizen groups commented on the 1974 draft environmental statement.

9.09 PUBLIC MEETING. A public meeting sponsored by the IBWC and conducted by the Corps of Engineers as agent for the IBWC was held in San Diego on April 8, 1976. The purpose of this meeting was to receive additional views and comments of all interested persons, groups, and agencies on the draft statement and on the proposed plan prior to the preparation of a final environmental statement. The public meeting was attended by about 96 persons, including representatives of Federal, State and county and local governments, citizen and environmental groups, private interests and individuals. Thirty people delivered oral and/or written statements.

9.10 In a statement delivered by a representative, Congressman John Van Deerlin expressed the need to settle for the proposed project, indicating a cost of less than one-third as much as a complete channel to the ocean, in order to honor our commitment to Mexico, or else settle for nothing at all which would not be in our best interest. In oral or written statements at/or following the public meeting two agencies, seven groups, and seven individuals supported the proposed plan: California Department of Parks and Recreation; U.S. Fish and Wildlife Service; Otay Mesa Homeowners' Association; San Diego Chapter, Sierra Club; Zero Population Growth; San Diego Flood Plain Technical Committee; San Diego Audubon Society; Citizens Coordinate for Century 3; and residents of Imperial Beach, Chula Vista, and San Diego. The important reasons for support of the proposed project were: preservation of lower Tijuana River valley open space; protection of the Tijuana Estuary; recognition of the value of coastal wetlands; land-use regulation is a proper approach to flood control on undeveloped flood plains; less cost than channelization alternatives; and satisfying our obligation to Mexico.

9.11 One agency, seven groups and nine individuals opposed the proposed plan and favored the full channelization alternative: City of Imperial Beach; Border Area Citizens for De-Annexation, San Ysidro; Tijuana Valley County Water District; San Ysidro Chamber of Commerce; South Bay District Chamber of Commerce; South Bay Economic Council; San Ysidro Property Owners Association; Concerned Younger Citizens of Imperial Beach; Nelson and Sloan, Helix Corporation; and residents of La Mesa, Nestor, San Ysidro, National City, Chula Vista, and San Diego. The important reasons cited by those opposing the proposed plan were: whether the proposed dissipator plan had been approved by Mexico; the present agreements with Mexico pertain only to a channel project to the ocean, whether additional Congressional action on the project is necessary; allows pollution from

Mexico to be deposited on the flood plain in the United States; no direct benefits to valley landowners; project only protects Mexico; they favor Border Area Plan developments; loss of landowner rights; Imperial Beach can not develop its assets; channel to ocean necessary to honor agreement to Mexico; investments of those buying Tijuana River Valley lands should be honored by the City of San Diego; concern about lives of Imperial Beach residents; desire for development of the valley in Mission Bay style; and report does not provide adequate engineering design data.

9.12 The comments received at the public meeting were considered in the preparation of the final environmental statement.

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28. Powell, W. Robert, 1973, Inventory of Rare, Endangered and Possibly Extinct Vascular Plants of California, California Native Plant Society.
29. Comprehensive Planning Organization of the San Diego Region, 1974, Letter to Board of Directors from the Executive Director.

30. State of California, 1972, California Regional Water Quality Control Board, San Diego Region, Letter to South Bay District Chamber of Commerce, Inc., 3 pp.
31. California Coastal Zone Conservation Commissions, December 1975, California Coastal Plan, 443 pp.
32. U.S. Army Corps of Engineers, Los Angeles District, Feb. 1975, Final Environmental Statement, San Diego Harbor, San Diego County, California, 84 pp and appendixes.
33. Tudor Engineering Company, May 1973, Engineering Reconnaissance, Study of Soil, Water, and Water Supply Problems: Tia Juana River Valley, 110 West C. St., San Diego, California 92101, 56 pp. and maps.
34. California Department of Fish and Game and U.S. Bureau of Sport Fisheries and Wildlife, April 1974, Acquisition Priorities for the Coastal Wetlands of California, a joint report compiled by Richard D. Bauer, and John V. Speth, 38 pp.
35. City of San Diego, January 1976, Tia Juana River Valley Plan and Environmental Impact Report, City Planning Department, 92 pp.
36. International Boundary and Water Commission, May 1976, Environmental Assessment of a Project Modification for the Tijuana River Flood Control Project, prepared by the U.S. Army Corps of Engineers, Los Angeles District, 5 pp.
37. City of Imperial Beach, 1973, Open Space and Conservation Element to the General Plan, Prepared by Owen Manard and Assn., Claremont, California, 92 pp.
38. City of Imperial Beach, December 1968, Imperial Beach, California, General Plan: 1990, prepared by Williams, Cook and Mocine, San Francisco, 76 pp.

APPENDIX

A

DEPARTMENT OF PARKS AND RECREATION

P.O. BOX 2398
SACRAMENTO 95811

August 1, 1973

Mr. Garth A. Fuquay, Chief
Engineering Division
Department of the Army
Los Angeles District
Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053

Dear Mr. Fuquay:

This is in response to your letter of July 13, 1973, regarding your preparation of a draft Environmental Statement for the proposed Tijuana River Flood Control project. In your letter you solicit my comments on the effects of the proposed project upon historical and archeological resources in the area.

In the judgment of this Department there will be no adverse effect on the historical and archeological values presently known in the subject project area. However, our knowledge in the matter can be stated with authority only for those areas now under our administration. I cannot speak for those areas of the lower Tijuana River Valley in which your construction and that of Mexico will be undertaken. I strongly suggest that those areas outside of our ownership or jurisdiction be reviewed by professional archeologists in the field to make certain that historical, archeological and paleontological values are not unnecessarily damaged or destroyed.

For the necessary site identification, please contact the following person:

Mr. Ronald May
Society for California Archeology
Archeological Representative
Department of Anthropology
California State University, San Diego
5402 College Avenue
San Diego, California 92115

We have found no State Historical Landmarks, State Points of Historical Interest or Sites on the National Register of Historic Places to be in the immediate area of the project.

Sincerely,

William E. Mott, Jr.
DEPUTY DIRECTOR
Director

M-3a/1

A-1

**Advisory Council
On Historic Preservation**

1522 K Street N.W. Suite 480
Washington D.C. 20005

May 29, 1974

District Engineer
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053

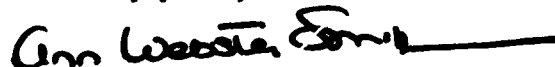
Dear Sir:

This is in response to Mr. D. D. McNealy's request of May 1, 1974, for comments on the environmental statement for the Tijuana River Flood Control Project, San Diego County, California. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that your draft environmental statement appears procedurally adequate. However, we have the following substantive comments to make:

To insure a comprehensive review of historical, cultural, archeological, and architectural resources, and, in accordance with the August 1973 comments and recommendations of the California State Historic Preservation Officer, the Advisory Council suggests that the final environmental statement contain evidence of contact with Mr. Ronald May, Society for California Archeology, Archeological Representative Department of Anthropology, California State University, San Diego, 5402 College Avenue, San Diego, California 92115.

Should you have any questions or require any additional assistance, please contact Jordan Tannenbaum (202-254-3974) of the Advisory Council staff.

Sincerely yours,



Ann Webster Smith
Director, Office of Compliance

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.



ER/74-604

UNITED STATES
DEPARTMENT OF THE INTERIOR

OFFICE OF THE SECRETARY

PACIFIC SOUTHWEST REGION

BOX 38098 • 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102
(415) 556-8200

June 20, 1974

District Engineer
Los Angeles District
Corps of Engineers
Department of the Army
P.O. Box 2711
Los Angeles, California 90053

Dear Sir:

The Department of the Interior has reviewed the draft environmental statement for the Tijuana River Flood Control Project, San Diego County, California.

We suggest the current Bureau of Sport Fisheries and Wildlife reference "Threatened Wildlife of the United States," 1973 edition, be cited in the final statement. In addition, the State of California now lists Belding's savannah sparrow as an endangered species. Paragraph 37 on p. 9 mentions the endangered species that inhabit the estuary and adjacent areas. Paragraph 73 states that no rare or endangered plants and animals use or are located in the project area. This appears to be contradictory and should be clarified. Since the project area and the estuary are only approximately 3 miles apart, an explanation of why the project area is not used by the endangered species of birds should be discussed.

The description of black rail habitat states that the bird is entirely dependent upon the salt marsh. We feel this statement should be modified. Black rails have been observed inhabiting inland fresh water marshes on the lower Colorado River.

Although the proposed action could adversely affect the Tijuana River Estuary, a National Natural Landmark, it would not affect any historical or environmental education landmarks. However, we suggest the final statement provide more substantive information regarding the project's impact upon historical and archeological resources, and thus allow assessments of these aspects of the project itself and of the alternative described in the statement.

The information on the archeological resources should be documented. We concur with the Department of Parks and Recreation's letter of August 1, 1973, appearing in the appendix of the draft statement, that those areas of the river valley in which your construction and that of Mexico's will be undertaken should be reviewed by professional archeologists in the field to make certain that no archeological resources will be unnecessarily damaged or destroyed. We recommend that a survey of the area be made by a professional archeologist to identify and evaluate the archeological resources present. There is a high potential for such resources in a river valley. It is estimated that 36 percent of the approximately 6,500 prehistoric sites which existed in San Diego County in A.D. 1800 have been destroyed by historic land use activities (Moratto, 1973).

The findings and recommendations of the archeologist who performs the survey should be included in the final statement. If significant archeological resources are identified, they should be described and evaluated. Proposed mitigative measures should be discussed in the final statement. We suggest that decisionmakers be provided with the factual data needed to evaluate the effects of the project and to consider alternatives which would have a lesser effect. In the absence of contrary evidence discovered by an archeological survey, it appears that the recommended plan would have the least effect upon the archeological resource in the area.

The statement mentions that sediment in the bottom of the energy dissipator would possibly be deposited in borrow pits that were excavated for construction of Interstate 5. Disposal of the spoil should be described in more detail plus potential spoil sites other than the borrow pits.

In our examination of the sand and gravel pits located downstream from the area to be protected, areas used for dumping of refuse, no doubt illegally, were discovered. Floodwaters directed into the natural channel from the low flow channel will carry this accumulated trash downstream. This is a definite source of pollution that threatens the marine environment and the Tijuana River Estuary. The final statement should contain a discussion of this potential pollution hazard, its possible degrading effect on downstream habitat, and suggested preventive measures.

The discussion of adverse environmental effects that cannot be avoided does not adequately describe possible adverse impacts to the Tijuana River Estuary if a major flood occurs. Possible adverse impacts should be discussed in detail.

The Department of the Interior recommends that a section dealing with mitigation and protective measures included in the project

be added to the statement. All environmental protective measures incorporated into the project should be discussed along with any mitigation for irreplaceable losses incurred by the project. The Department suggest a monitoring study of possible adverse impacts to the Tijuana River Estuary be implemented as a mitigative measure.

Cordially,



Webster Otis
Special Assistant to the Secretary

cc: OEPR, D.C.
Regional Director, BR, Boulder City
Regional Director, BSF&W, Portland
Regional Director, NPS, SF
Director, USGS, D.C.
Director, BOM, D.C.
Regional Director, BOR, SF
Area Director, BIA, Sacramento
State Director, BLM, Sacramento

AD-A136 675

TIJUANA RIVER FLOOD CONTROL PROJECT SAN DIEGO COUNTY

2/3

CALIFORNIA(U) INTERNATIONAL BOUNDARY AND WATER

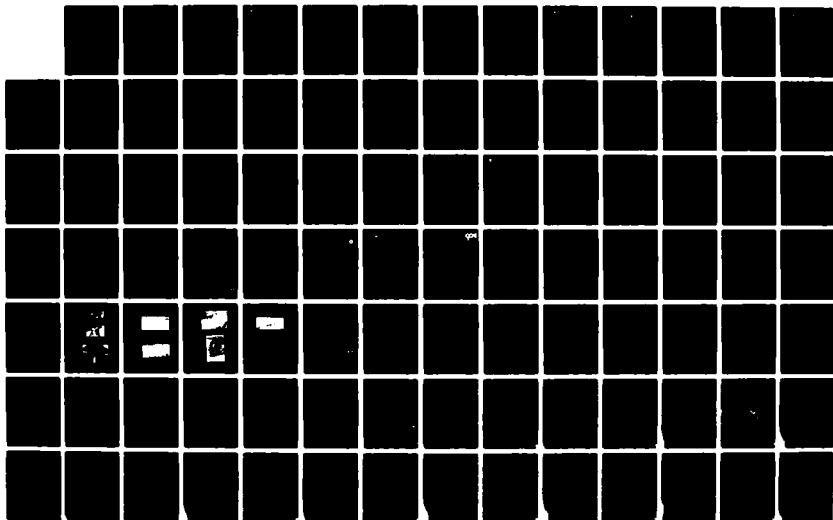
COMMISSION EL PASO TX UNITED STATES SECTION 20 MAY 76

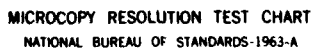
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IBWC-EIS-76-1

F/G 13/2

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

June 1974

SOUTH PACIFIC DIVISION COMMENTS
ON
DRAFT ENVIRONMENTAL IMPACT STATEMENT
TIJUANA RIVER FLOOD CONTROL PROJECT
SAN DIEGO COUNTY, CALIFORNIA
January 1974

1. Page 8, Paragraph 32. The Bureau of Sport Fisheries and Wildlife and the California Department of Fish and Game have prepared a cooperative report entitled "Acquisition Priorities for the Coastal Wetland of California" dated April 1974. This report places the Tijuana River Estuary in acquisition priority A for coastal wetland acquisition. This report should be referenced.
2. Page 9, Paragraph 37. The California black rail is not on the most recent (10-73) Federal Endangered Species list although it is on the State list. Therefore, the reference to the black rail as being on both the Federal and State lists should be corrected. The proper terminology in the Endangered Species Act of 1973 (P.L. 93-205) is "Endangered Species" and not "Rare and Endangered." This terminology should be corrected accordingly.
3. Page 14, Paragraph 58. The 1 August 1973 letter from the State Historic Preservation Officer recommends that those areas outside State jurisdiction be reviewed by professional archaeologists in the field to make certain that historical, archaeological, and paleontological values are not unnecessarily damaged or destroyed. He further recommends that Mr. Ronald May of the Society for California Archeology be contacted. If this has been accomplished, it should be documented in this paragraph. If not, steps should be taken to coordinate with Mr. May and have those areas outside State jurisdiction reviewed by professional archaeologists in the field.
4. Page 17, Paragraph 76, Sixth Line. The statement that less sand will reach the ocean after the project is constructed is not consonant with the penultimate sentence of Paragraph 81. The energy dissipator is to reduce the high velocity flows from the upstream improved channel to the uncontrolled velocity levels of the present natural channel. Thus the net sediment load transport capability of the river emptying into the ocean is essentially unchanged.

5. General Comment on Tables 3, 4, 5, 6, 7, 8, 9, and 10. It should be indicated on what the information contained in these tables are based.

6. Tables 1 and 2 and Plate 1. The location of the two river gage stations and the referenced wells should be shown on the plate for added clarity in understanding the changes in river discharges with distance downstream and variations in the ground water levels relative to the ocean.

7. In the absence of an accompanying design memorandum, or an engineering design analysis, it is not possible to verify the stated functional proficiency of the recommended plan. Thus, concurrence in the recommended plan is limited to concept only.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

D. D. McNealy
International Boundary and Water Commission
200 IBWC Building
4110 Rio Bravo
El Paso TX 79998

JUN 11 1974

Dear Mr. McNealy:

The Environmental Protection Agency has received and reviewed the draft environmental impact statement for the following proposed project, Tijuana River Flood Control Project, San Diego County, California.

EPA's comments on the draft statement have been classified as Category IO-2. Definitions of the categories are provided on the enclosure and our extensive comments will be found on a second enclosure. The classification and the date of EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the impact statement at the draft stage.

EPA appreciates the opportunity to comment on this draft statement and requests two copies of the final statement when available.

Sincerely,

Original signed by
Paul De Falco, Jr.
Paul De Falco, Jr.
Regional Administrator

Enclosures

cc: Council on Environmental Quality, Wash., D.C. 20460
Attn: Editor, 102 Monitor (10 copies)
District Engineer, Los Angeles District
U.S. Army Corps of Engineers

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

Comments on the draft environmental statement Tijuana River Flood Control Project, San Diego County, California.

1. EPA commends the International Boundary and Water Commission, and the City of San Diego, for the adoption of the recommended plan and the incorporation of a flood plain management approach to land uses in the lower Tijuana River Valley.

2. EPA suggests that maps be included in the EIS showing the 100 year flood plain and the Standard Project Flood. The inclusion of this material will assist in the assessment of the environmental impact of the proposed project.

3. On page 8 of the EIS, there is a discussion on the considerations of the "California Protected Waterways Plan" for protection and preservation of the Tijuana River Estuary:

a. What is the status of bill No. 3, 1964 (presented in Congress June 7, 1973)?

b. What is the likelihood of the inclusion of the Tijuana River Estuary in the National Registry of Natural Landmarks?

c. Will this proposed project bias or jeopardize the potential for national protection and preservation at the Estuary?

4. EPA suggests that more information be presented on the Tijuana River Estuary. Such discussion should be expanded, but not necessarily limited to include the following:

a. Will the project increase or decrease the sediment accumulation rate in the Estuary? It is stated on page 18, (paragraph 81) that, "The project will not have any direct environmental impact upon the Estuary because . . . existing runoff and sedimentation conditions will be sustained." Yet, on page 17 (paragraph 76) it is stated, "Although accumulating sediments fill the Estuary and shorten its life as an estuary . . ."

b. Paragraph 81 suggests that there will be an increase in deposition of ". . . fine sands and silts . . ." in the Estuary. In an attempt to understand the impact of this increase, it is suggested that information be presented on

tidal action:

(1) What is the tidal prism range of the Estuary and

(2) are the tides adequate to accommodate the increase in sediments through tidal scour?

c. What is the quality of water in the Estuary? It is suggested that information be presented on nutrient levels, salinity and dissolved oxygen ranges.

d. In paragraph 82, there is a discussion on the quality of ground water as related to irrigation uses. It is stated that the City of San Diego has proposed importing water to help meet irrigation needs. While the proposed project will result in a reduction of irrigable lands (paragraph 70):

(1) To what degree is the importation of water for irrigation contingent on the project, i.e., what is the status of the city's proposal vis-a-vis the proposed project?

(2) With the possible importation of water, to what extent will nutrient-rich agriculture return flows affect the Estuary?

e. On page 8 (paragraph 34) the statement is made that, "Great volumes of fresh water . . . will kill many salt species in the Estuary . . ." Is there a history of these kills?

5. In paragraph 41 (page 10) the comment is made that, ". . . developers, investment groups, and speculators presently own all but 200 acres of the flood plain." The EIS indicates that there are 4,800 acres in the SFP plain. The land use breakdown on page 10 shows approximately 2,600 acres occupied by the Estuary, Naval Air Station, State Park, and urban, public and commercial facilities. Therefore, it is difficult to understand the "200 acre" figure.

6. It is stated on page 12 that, ". . . no sanitary sewers will discharge to the Tijuana River . . .":

a. What is the expected level of treatment for the sewage, and

b. where will the effluent be discharged?

7. The EIS indicates (paragraph 76) that, "slightly less sand will reach the ocean to aid in beach sand replenishment." EPA is aware of a proposed Federal project for beach protection at Imperial Beach. In view of these points:

a. What is the expected amount of reduction of sand for beach replenishment?

b. What percentage of sand from the Tijuana River effects sand replenishment at Imperial Beach?

c. EPA suggests reconsideration be given to the utilization of the borrow pits for potential spoil deposition of sediments removed from the sedimentation area during operation and maintenance (paragraph 78). If the sediments prove to be primarily sand, it is conceivable that this material may be used for beach replenishment.

8. On page 19 (paragraph 85) the statement is made that, "... storm runoff . . . during construction will cause localized soil erosion." EPA suggests that there be discussion on mitigating measures for this problem to minimize possible adverse environmental effects.



COMMANDANT
ELEVENTH NAVAL DISTRICT
SAN DIEGO, CALIFORNIA 92132

IN REPLY REFER TO:

6240
Ser 32/192
1 1 JUN 1974

From: Commandant, Eleventh Naval District
To: District Engineer, U. S. Army Corps of Engineers, Los Angeles
District, P. O. Box 2711, Los Angeles, California 90053

Subj: Draft Environmental Statement, Tijuana River Flood Control
Project, San Diego County, California; comments on

Ref: (a) International Boundary and Water Commission, El Paso,
Texas ltr of 1 May 1974

1. As requested by reference (a), the environmental statement for the subject project has been reviewed. Construction of the flood control channel as recommended by the San Diego City Council is strongly supported as this plan provides the best protective zoning for the Naval Air Station, Imperial Beach.

2. Flight operations at the Naval Air Station, Imperial Beach are expected to continue for the foreseeable future. In order to ensure the integrity of flight operations, the Navy has acquired approximately 664 acres of land to the east, south, and west of the station and has outleased a 283-acre parcel of this acquisition to the State of California for a wild life sanctuary. Further, the Navy made available to the State of California approximately 378 acres of land to the south of the Air Station for park purposes. The State is currently negotiating to acquire the privately owned property lying between these two parcels in order to develop Border State Park. This facility will no doubt become a very valuable public asset.

3. The Navy will defer to other interested agencies comments with regard to the impact on the natural environment.

E. B. GILKESON

Copy to:
COMNAVAIRPAC
CO WESTNAVFACENGCOM San Bruno
CO NAS Imperial Beach
DIR WESTNAVFACENGCOM BR SDIEGO

NORMAN B. LIVERMORE, JR.
SECRETARY

RONALD REAGAN
GOVERNOR OF
CALIFORNIA

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95834

Department of Conservation
Department of Fish and Game
Department of Navigation and
Ocean Development
Department of Parks and Recreation
Department of Water Resources



Air Resources Board
Colorado River Board
San Francisco Bay Conservation and
Development Commission
State Lands Commission
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Boards

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

AUG 20 1974

Colonel John V. Foley
District Engineer
Los Angeles District
Corps of Engineers
U. S. Department of the Army
Post Office Box 2711
Los Angeles, CA 90053

Dear Colonel Foley:

The State Departments of Food and Agriculture, Transportation, Health, Conservation, Fish and Game, Navigation and Ocean Development, Parks and Recreation, and Water Resources; the State Water Resources Control Board; the Air Resources Board; the Solid Waste Management Board; and the Coastal Zone Conservation Commission have reviewed the "Draft Environmental Statement, Tijuana River Flood Control Project, San Diego County, California", January 1974. This review was in accordance with Part II of the U. S. Office of Management and Budget Circular A-95 and the National Environmental Policy Act of 1969.

The various comments of those agencies are summarized below:

Fire Protection and Forest, Range and Watershed Resources --
The project will have little direct impact on those resources. However, the condition of the Tijuana River watershed will have a major impact on the project.

We suggest that the EIS address the question of the watershed's condition in the section on the Environmental Setting and wherever else appropriate in other sections of the EIS. It should be recognized that this watershed has been subject to frequent and extensive wildfire, particularly in Mexico. This pattern is likely to continue.

Such fires often have a pronounced effect on the hydrologic response of watersheds and an even more pronounced effect on sedimentation rates. The dams in the upper watershed will trap sediment and frequently reduce peak flows. However, fires in the lower uncontrolled portions of the watershed may substantially increase peak flows and sedimentation rates for several years following each fire.

The EIS provides considerable information on hydrology and sedimentation, but not in relation to watershed conditions. Since the important element with respect to watershed condition is vegetative cover, the EIS should provide a more comprehensive description of vegetative cover in the watershed above the project, including not only present vegetative cover, but also the probably vegetative response to fire. This should be related to hydrologic response and sedimentation.

These considerations may be important in the design and operation of the project. The Department of Conservation, Division of Forestry, Southern California Region Headquarters in Riverside (714-684-4760) will be available to discuss local matters of watershed management and fire occurrence with the sponsor.

Sewage Discharge Problems -- Paragraph 49, page 11, states that "the possibility of flood runoff including domestic sewage is minimal ... limited to flood borne contributions from rural areas." This is incorrect. Sewage from Tecate, Mexico, flows down Tecate Creek to Cottonwood Creek, thence to the Tijuana River. If the flood control channel is extended to the Tecate River at its confluence with Cottonwood Creek, the Tecate sewage discharge could easily flow down the impervious channel to the United States.

In the City of Tijuana, chronic problems with overflowing, broken sewer lines result in sewage discharges to the Tijuana River. These sewage discharges to the River result in contaminated water, possible health hazards, and general degradation of water quality in the United States. If these discharges should reach the Tijuana estuary in significant volume, they may contribute to eutrophication and reduce the oxygen resources in the estuary. Nutrient materials in the waste may cause algal growths which are detrimental to the marsh habitat for aquatic life.

Archeological Resources -- Since this is a federal project which will involve site disturbance, the sponsors should be aware that compliance is required with Executive Order No. 11593,

Colonel John V. Foley

-3-

"Projection and Enhancement of the Cultural Environment". The final EIS should further identify possible archeological sites in areas that would be impacted by construction. The results of this survey, along with the name and professional affiliation of the persons conducting the survey, should be included in the final statement.

According to Mr. William Penn Mott's letter of August 1, 1973, to the Los Angeles District of the Corps of Engineers, a field review by professional archeologists should be undertaken to ensure this protection, although there appeared to be no adverse effect on known historical and archeological values. This particular point has not been dealt with in the draft EIS.

The report should recognize these problems and discuss the measures which can be taken by Mexico, as well as those to be taken by the U. S. federal and state agencies, to alleviate the problems.

Thank you for the opportunity to review and comment on this report.

Sincerely yours,

M. B. LIVENMORE, JR.
Secretary for Resources

By Paul L. Clifton

cc: Director of Management Systems
Office of Planning and Research
State Clearinghouse
1400 Tenth Street
Sacramento, California 95814
(SCH No. 74051390)



THE CITY OF

SAN DIEGO

CITY ADMINISTRATION BUILDING • 202 C STREET • SAN DIEGO, CALIF. 92101

OFFICE OF THE
CITY MANAGER
236-6363

June 11, 1974

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
P. O. Box 2711
Los Angeles, California 90053

Dear Sir:

This correspondence represents the response of the City of San Diego relative to the draft Environmental Impact Statement for the proposed Tijuana River Flood Control Project. City staff of the Community Development, Environmental Quality and Planning Departments participated in the preparation of these comments.

In general, the Environmental Impact Statement appears to be complete and accurate, and adequately addresses the potential environmental impacts of the proposed project. The report indicates that the project is in conformance with the current land use policies of the City of San Diego. It would be appropriate that the EIS also discuss more completely the extent to which the proposed project and each alternative meet the goals and objectives of federal, state, and regional government. For example, the Comprehensive Planning Organizations on April 15, 1974, adopted the following policy statement for the Tijuana River Valley, as part of the CPO Initial Coastline Plan:

"The regional policy regarding the Tia Juana Valley should be to build a flood control system sufficient to meet the international treaty with Mexico, protect life and property in the 1973 existing urbanized area from the dangers of flooding and health hazards caused by polluted water, and preserve the estuary and its wildlife habitat. The International Boundary and Water Commission and the Corps of Engineers should show specifically as part of the environmental impact statement that any system proposed by them will clearly satisfy these requirements. Floodplain zoning should be applied as part of the flood control system."

In addition, the California State Department of Park and Recreation Report to the State Legislature (ACR 65) recommends that the lower Tijuana Valley be preserved, that the Corps of Engineers abandon the concrete flood control channel concept, and that State and local governmental bodies explore alternatives for acquisition of an enlarged Border Area Park.

Based on our review of the EIS, we would also like to comment specifically on the following sections of the report:

Project Description

Operation and Maintenance - paragraph 9

In this section it is stated that "... local interests will be responsible for the sediment deposition area". This responsibility should be clarified. It is the City's understanding that this paragraph refers to responsibility as outlined in a letter dated February 6, 1973, from Commissioner Friedkin of the IBWC to Mayor Wilson of the City, as follows: "City would be required, under the authorization by the Congress, to either furnish the rights-of-way for sediment deposits or indemnify the Government against any such damage suits. If the area is to be acquired by the City for a golf course or other public use, as indicated in the Preliminary Concept Plan, the United States needs could be satisfied without acquisition for rights-of-way for sedimentation. The City would also need to furnish such areas as may be required for disposal of sediments from the flared section of the channel." No decision has yet been made regarding the City's maintenance and operation responsibilities in the sedimentation area.

Environmental Setting Without the Project

Recreation - paragraph 54

The total acreage under State Park management is 670 acres, not 655 acres as presented in this paragraph.

Environmental Impacts of the Proposed Plan

Land Use - paragraph 70

It should be mentioned in this section that Brown Field, to the east of the project area, is being considered for future development as an International Airport. If the proposed airport facilities were constructed, the Tijuana River Valley would be in the flight path of aircraft from Brown Field. Retention of the valley for agriculture and recreation as proposed in this project would provide more compatible uses in the noise zones of aircraft operations than would the intense urban development that would be permitted by the other flood channel alternatives.

Page 3
District Engineer

Open Space - paragraph 79

The project would provide 430 flood protected acres in the San Ysidro corridor area, not 370 acres as stated in this paragraph.

Recreation - paragraph 83

The proposed project would allow continued recreational uses of the Tijuana River Valley. In addition, the City of San Diego currently proposes the development of three neighborhood parks, with a total of approximately 20 acres, adjoining the proposed project area.

Esthetics - paragraph 84

A more precise description of the proposed landscaping should be included in this section. Landscaping should be provided in accordance with the City of San Diego Land Development Ordinance.

Plate 3

The designation of a neighborhood park and elementary school south of Monument Rd. is incorrect and should be deleted from this plate.

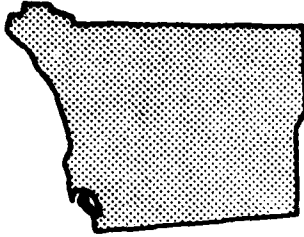
The Tijuana River Valley and Estuary are unique resources requiring protection and preservation. The City of San Diego feels that the environmental impacts of the proposed project and alternatives have been adequately addressed. It is our considered judgement that the proposed project represents the most environmentally sound alternative consistent with the expressed goals and objectives of state and local government. We appreciate the opportunity to review and comment on the Environmental Impact Statement for this project.

Sincerely,



Kimball Moore
City Manager

KM/TL: mc



SAN DIEGO COUNTY FLOODPLAIN TECHNICAL COMMITTEE

5377 REDDING ROAD SAN DIEGO, CA 92115

May 30, 1974

District Engineer
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles, CA 90053

Dear Sir:

The San Diego County Floodplain Technical Committee (see enclosure) appreciates the opportunity to comment on the Draft Environmental Statement for the revised Tijuana River Flood Control Project. We wish to commend the Corps for the overall quality of the report. Most of our comments will be of a perfecting nature.

There is an apparent omission in the list of alternatives studied as presented in the two summary pages. Plate 8 refers to a Plan D which is not described in the summary pages (although it is on page 23).

In paragraph 14 it would be more accurate to describe the climate of the lower valley as subtropical steppe (ESh) rather than just subtropical, the latter term usually referring to moister climates (C type) not found in the coastal zone. 1967 and 1973 might be added to the list of years with above average precipitation in paragraph 15; these were years of above normal rainfall in downtown San Diego and probably were in San Ysidro as well.

In paragraph 16, it might be advisable to check as to whether Pliocene sandstones really overlies Pleistocene ones. This would be a reversal of what would normally be expected, and is probably an error.

It might be noted that Tables 4 and 7 represent only a partial listing of the birds found in the floodplain and estuary. In all over 300 species have been observed there; thus, the figure of 86 in paragraph 31 is misleadingly low. If the figure of 86 refers only to nesting species, this should be so stated.

We are particularly happy to see certain statements included in the report, such as the last sentence on page 26, the sixth

District Engineer, Corps of Engineers
SDCFTC statement on draft Tijuana EIS

sentence in paragraph 42, and the second sentence of paragraph 66, as they will help to clarify some locally held and widely repeated misconceptions. However, we still encourage the Corps, as we have in comments to previous environmental impact statements, to refrain from using the phrase "elimination of flood hazards" (as on pages 20 and 22) when referring to structural alternatives. Hydrologic events in the east and midwest over the past two years should make the reasons for this clear.

For the San Diego County Floodplain Technical Committee,



Philip R. Pryde
Chairman

The San Diego County Floodplain Technical Committee

The San Diego County Floodplain Technical Committee is a working committee comprised almost entirely of professional persons with specializations in areas relevant to floodplains and flood protection planning. The Committee presently numbers over twenty persons, including biologists, economists, civil engineers, zoologists, meteorologists, botanists, geographers, geologists, and lawyers. They reside in all parts of San Diego County. The officers of the Committee for 1972 are:

Chairman:	Philip R. Pryde, Ph. D. (Geography)
Vice-Chairman:	Joy Zedler, Ph. D. (Biology)
Secretary:	R. Mitchell Beauchamp (Botany)

The purpose of the Committee is to provide an independent source of technical review for floodplain management proposals for San Diego County streams. It is an independent organization and is not affiliated with any other group or organization. It stands ready to be of assistance to local or federal agencies in any manner that it can.



Cramer Corporation

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26 AUG 1974

Mr. Garth A. Fuquay/Engineering Department
Dept. of the Army/Los Angeles District
Corps of Engineers
300 North Los Angeles Street
LOS ANGELES/CA/90053

FILE: CC-74-155

SUBJECT: Tia Juana River Flood Control Project.

Dear Garth:

In accord with arrangement made during our 2 May/74 conference with Lt-Col. Metalios and staff at your Los Angeles Headquarters, and with contents of our letter to you of 26 July/74, herewith are two [2] copies of our report, title: COMMENT REPORT on DRAFT ENVIRONMENTAL STATEMENT for TIJUANA RIVER 'FLOOD CONTROL' PROJECT. The report is highly critical of the DES document, for reasons that were covered at the above Los Angeles meeting.

We are conscious that contrary to the Corps of Engineers' usual role in their many projects over the years, in the case of the Tijuana River Flood Control Project, the Corps - for literally the first time - does not enjoy a decision-making position; and that in this instance, that position is occupied by the US Dept. of State, acting through the International Boundary & Water Commission/US Section.

We also realize that the Alternative III-A project concept is not the choice of the US Corps, and that their original first choice, and still their first choice today, is a fully-lined channel to connect the existing Mexican channel to the Pacific Ocean. This latter is the project that has been authorized by Congress, and which is fully financed. On the contrary, the Alternative III-A concept has not been approved by Congress; is not financed; and is the concept for which the City of San Diego is politically responsible, and has attempted to promote.

We sincerely hope that our comments on the DES document will assist the US Corps in having the original flood control channel undertaking placed into position where construction can proceed

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Planning / Design / Engineering / Project Management

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Cramer to Corps of Engrs. - TJ River - Page 2 - Date: 26 AUG 1974

without further delay, and without further prolongation of the disastrous flood damage potential presently overhanging the Tijuana River Valley.

This opportunity to furnish a comment report to the above DES document is greatly appreciated. If that might be required, we will gladly cooperate in furnishing whatever additional data or backup material is pertinent to the report subject.

Yours Sincerely

CRAMER CORPORATION

By: LSM

L. E. CRAMER/President

LEC:k
Encl-2

C O N C L U S I O N S

1 - The DRAFT ENVIRONMENTAL STATEMENT - hereinafter designated DES - for a so-called flood control project in the valley of the Tijuana River, has been prepared prematurely. The project which that DES document recommends and is largely concerned with, has not been funded or approved by the US Congress; nor is there any likelihood at this time [Aug/74] or in foreseeable time, that the project designated by the City of San Diego as Alternative III-A [Recommended Plan in DES] can ever be funded.

2 - It appears that the DES was written around - in apparent attempt to justify - a pre-determined course of action conceived for political purposes by the current Mayor of the City of San Diego. The DES "Recommended Project" [Alternative III-A] violates sound engineering principles, sound engineering judgements, sound economic principles, sound environmental principles, and appears to contribute to circumvention of the following Public Laws: a] 91.190 - Environmental; b] 286 - 74th. Congress - Treaty with Mexico; and c] 89.640 [1966] - authorizing flood control project in Tijuana River Valley.

3 - No sound engineering evidence, fiscal evidence, social evidence, or environmental evidence has been presented in the DES to justify implementation of the "Recommended Project" [Alternative III-A] over any other alternative to the authorized project for construction of a flood control channel from terminus of the Mexican channel to the Pacific Ocean.

4 - The final Environmental Statement - if one should ever be prepared for the Alternative III-A concept - should be completely re-constituted to eliminate the preconceived political notions that resulted in formulation of the "Recommended Project".

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5 - The DES document is a bewildering mixture of scientific/unscientific, economic/uneconomic, and political 'solution[s]' for what, above all, is strictly a scientific/economic problem.

6 - The DES does not assess the dire necessity for a project that would bring control of the occasional major floodings over Tijuana River basin and deltaic plain [Standard Project Flood is rated by US Army/Corps of Engineers at 135,000 cubic-feet-per-second]. This type of flood - under the 'solution' offered by the "Recommended Project" - would ravage approximately 5,200 acres of valuable privately-owned lands in the valley of the Tijuana River, north of the boundary with Mexico.

7 - The proposed "Recommended Project" [Alternative III-A] is NOT a "flood control project", as is claimed and designated in the DES document. Under no stretch of the imagination can a project merit or deserve the nomenclature: "Flood Control Project", if it would result in converting to permanent floodplain a potentially desirable and useful area of 5,200 acres with the substantial intrinsic value of Fifty Thousand Dollars [\$50,000.] per acre. The final environmental Statement - if written - should delete the "Flood Control Project" delusion, and substitute appropriate terminology.

8 - The DES lists a series of nebulously-explained and frequently insignificant components under the heading of: FAVORABLE ENVIRONMENTAL IMPACTS. These are:

- a) Preservation of status quo water supply;
 - b) Prevention of backwash flooding into Mexico;
 - c) Preservation of open space;
 - d) Retention of beneficial effects of periodic flooding;
 - e) Fertilization of delta lands by depositions;
 - f) Recharge of groundwater zones;
 - g) Flushing of salts from surface soils
 - h) Encouragement of urbanization on [only] 370-acres;
- [NOTE: This urbanization factor is also listed as an ADVERSE ENVIRONMENTAL IMPACT]

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- i] Use of floodplain for agriculture; and
- j] Use of floodplain for recreation.

NONE of the above-listed components have any real validity, nor can substantial evidence be found for any single component to render it worthwhile enough, or significant enough, to be listed an environmental advantage in a document of the type being commented on here. Each component is individually dealt with further on herein.

9 - The comparatively insignificant nature of each and every FAVORABLE ENVIRONMENTAL IMPACT listed in the DES, is strong evidence that formulators of the DES experienced considerable difficulty in identifying a single favorable impact inherently worthwhile. On the other hand - there is a long series of UNFAVORABLE ENVIRONMENTAL IMPACTS for the Alternative III-A dissipator/dike 'solution' for flood problems over the Tijuana River Valley, that have NOT BEEN LISTED in the DES. These UNFAVORABLE ENVIRONMENTAL IMPACTS would bring about serious and adverse impacts - not only to the valley of the Tijuana River - but to the San Diego regional area in general, environmentally, economically, and socially - not only with respect to elements concerned with conditions by Nature - but with respect to people now living and working in that regional area, and for generation after generation into the unforeseeable future.

The unlisted adverse impacts are identified in Comment No. 13 herein.

10 - A characteristic of the DES document is dwelling overlong on items of little or no significance in the overall process of environmental evolution. A typical example is the emphasis here and there throughout the DES document that leaving from 370-400 acres available for so-called urbanization - out of a possible maximum of 4,500 acres [more or less], is a factor that calls for a parade of "106 trombones and 49 trumpets". The limits of environmental knowledge concerning the "Recommended Plan" [Alternative III-A], in effects, in justifiable usurpation of the existing temporary environment, and in control strategies regarding the aftermaths of implementing the "Recommended Project", are never reached in the DES document.

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11 - The "Recommended Project" [Alternative III-A] - if it should ever be implemented - will bring in its wake, regional unemployment to exceed the present [Aug/74] ten [10] percent index; broken families; broken businesses; financial disaster for a number of citizens; and general human misery among those directly affected. Those impacts will be part of the permanent and disastrous legacy of the "Recommended Plan" [Alternative III-A].

12 - Listed as ADVERSE ENVIRONMENTAL IMPACTS in the DES are:

- a) Permanent loss, disturbance, or alteration of riparian and floodplain vegetation;
- b) Loss of wildlife habitat in immediate project area;
- c) Short-term pollution during project construction;
- d) Encouragement of urbanization on [only] 370-400 acres; [NOTE: This urbanization factor is also listed in the DES as a FAVORABLE ENVIRONMENTAL IMPACT]
- e) Alteration of natural landscape;
- f) Smaller deposition of flood-related debris on US floodplain due to siltation and street runoff generated in the Mexican City of Tijuana, than under pre-project conditions.
[NOTE: A smaller quantity of debris from Mexico would be a definite ADVANTAGE - NOT A DISADVANTAGE. Actually, the "Recommended Project" [Alternative III-A] will result in larger - not smaller - quantities of pollutorial debris coming onto the US portion of the Tijuana River deltaic floodplain]

Each component in the above list will be individually dealt with and discussed further on herein.

13 - Completely omitted from the list of ADVERSE ENVIRONMENTAL IMPACTS that would be due to the "Recommended Project" [Alternative III-A], are the following:

- a) Loss of rights of private property owners;
[NOTE: Guaranteed under the US Constitution]
- b) Costs of acquisition of floodplain lands - estimated to be around TWO HUNDRED MILLION DOLLARS [\$200,000,000.];
- c) Loss of improvements contemplated by the SAN DIEGO 1966 BORDER AREA PLAN;
- d) Loss of around ten thousand [10,000] construction jobs every year for around twentyfive [25] years;

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- e] Loss of around two thousand [2,000] permanent jobs under the completed status of the SAN DIEGO 1966 BORDER AREA PLAN;
- f] Loss of estimated ONE HUNDRED & EIGHTYSIX MILLION DOLLARS [\$186,000,000.] property tax take during first fifty [50] years of project life, and under concept of the SAN DIEGO 1966 BORDER AREA PLAN;
- g] Loss of enormous recreational benefits for over five [5] million people per year in the water-oriented world that would be created under the SAN DIEGO 1966 BORDER AREA PLAN;
- h] Loss of incalculable cultural and other highly beneficial benefits inherent in the 950-acre INTERNATIONAL PARK [Not a State Park], that would promote, foster, and cement international relations with the people of Mexico;
[NOTE: This proposed INTERNATIONAL PARK is a key component of the SAN DIEGO 1966 BORDER AREA PLAN]
- i] Constant threat of loss of lives and property of recreationists and others using the floodplain - including users of Border Field State Park - due to flooding of the Tijuana River delta under a major runoff condition;
- j] Continuation of the process now going on toward complete filling-in of the Tijuana River Slough[s], and eventual elimination of the slough[s];
[NOTE: There is NO estuary at the present 'old' mouth of the Tijuana River]
- k] Complete destruction of any crops, operating plant, irrigation water distribution systems, and other tangible property and goods, on those lands which the City of San Diego intends to induce agricultural operations in event the "Recommended Project" [Alternative III-A] should be implemented - and under flood conditions involving the 50-year, 75-year, and Standard Project Flood potentials; and
- l] Pollutational inflowage from Mexican Cities of Tecate and Tijuana - as well as basin side slopes between City of Tijuana and Rodriguez Dam [11 miles upstream] - to include street wastes, septic tank installation seepages, and occasional raw sewage.

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14 - The permanent loss to the taxpayers, to the San Diego regional area, and to the Nation in general - in event the non-justifiable "Recommended Project" [Alternative III-A] concept is implemented over the Tijuana River Valley - is so huge and so disastrous, as to be well-nigh incalculable in the realms of human suffering and fiscal burdens - both in the immediate time frame and among generations yet unborn. The final Environmental Statement - if made - should thoroughly explore the physical, financial, and social consequences that are presently identifiable and/or estimable, of implementing the "Recommended Project" [Alternative III-A] in the Tijuana River Valley.

The final Environmental Statement should also illustrate the great complexity of problems that will develop over the Tijuana River Valley lands if that area is NOT improved along the lines contemplated by the approved SAN DIEGO 1966 BORDER AREA PLAN. The DES document completely skirts these important elements so directly intertwined with ecological and environmental matters.

The concepts of ecological preservation and environmental quality must be balanced : a] Against the needs of the industrial and business economy of the San Diego region; b] With the desires of our metropolitan area populations for water-based recreational developments such as would come with creation of facilities proposed under the SAN DIEGO 1966 BORDER AREA PLAN; and c] In conformance with the constitutional rights of American landowners.

15 - The so-called "Low Flow Channel" in the "Recommended Project" [Alternative Project], is shown in preliminary design data as 1.5 miles in length; a 230-foot bottom width; and a design Q of 1,000 cfs. Design velocity is not indicated - but terminal velocity at the outlet end of the dissipator structure - under Standard Flood Project flows, is calculated to be twelve [12] feet-per-second. That velocity of water flow, if it entered the low-flow earth-section channel, would literally tear it to pieces. There would be no vestige of the channel remaining after the flood flowage ceased.

It is thus recommended - to save the expensive restoration charges that would follow major floods exceeding probably around 2,000-cfs -

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that the low-flow channel be designed as a smaller cross-sectional prism and concrete-lined. It is further recommended that the low-flow channel be re-aligned from that location indicated in preliminary design data, and follow the same centerline alignment as intended for the original full-capacity flood control channel, for the complete distance from the dissipator structure to the Pacific Ocean.

It makes little sense to take the low-flow channel over to the old cut made by the 1941 Tijuana River flood, because that cut is only temporary, and any new flood exceeding 1,000 cfs Q would take a new route to the ocean.

This recommendation involves extension of the low-flow channel for several miles greater distance than indicated in preliminary design data.

Construction funds expended on creation of a low-flow channel as indicated in Plate 2 in the DES document, would be money wasted on a thoroughly useless facility of the "Recommended Project" [Alternative III-A].

16 - A serious shortcoming of the DES document concerns the already adopted and approved SAN DIEGO 1966 BORDER AREA PLAN [BAP].

The BORDER AREA PLAN is significantly mentioned in the DES, but most insignificantly described. DES detailed data regarding the BAP is missing. What should be a feature of any final Environmental Statement on the "Recommended Project". [Alternative III-A] should be complete information about the BAP - including photographs of the large-scale BAP model which is presently being held under lock in the City of San Diego Administration Building.

Evaluation of the original authorized flood control channel plan in the DES was made without the fullest consideration for the BAP and what it meant to the environmental health of San Diego. Proper evaluation of the authorized project for a full channel to the ocean, cannot possibly be made without placement of BAP in its right perspective in relation to the channel to the ocean.

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17 - The various courses proposed under the "Recommended Project" [Alternative III-A], and the train of results that would be a consequence of implementing the "Recommended Project", must presume the utilization of very large sums of public monies to carry out the proposal[s]. The City of San Diego - when it opted for Alternative III-A scheme in August/1973 - did so without the slightest conception of where the public funds would come from to implement the project that was voted through the City Council in Resolution[s] at the time. The total amount of the funds - direct and indirect - that would be required to accomplish all the objectives of the "Recommended Project" - including purchase of floodplain lands for park or any other purposes need to be spelled out in any final Environmental Statement that might be prepared for the "Recommended Project". If written, any final ES should include estimates of all public funds required to complete the Alternative III-A project concept in all its various aspects, whether those funds would originate in direct appropriations for the project; approval of bond issues for park purposes in the Tijuana River delta; or from any other source. It is the total cost of the "Recommended Project" that should be indicated - not simply the physical works included in the contributions by the International Boundary and Water Commission and the US Army/Corps of Engineers. Fund sources should be indicated. At time of writing these comments, the above total costs are estimated to be in the range of TWO HUNDRED MILLION DOLLARS [\$200,000,000.].

18 - The DES document fails to indicate the major environmental damages that would occur in the 5,200 acre Tijuana River Valley - including the existing Border Field State Park - should there be an event involving the Standard Project Flood of $Q = 135,000$ cfs. The DES fails to thoroughly point out the potential threats and dangers to all those present in that Valley or the Park at time of major flooding. Most certainly, these factors should be thoroughly covered in any final Environmental Statement.

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19 - The "Recommended Project" [Alternative III-A] contains a built-in delayed self-destruct mechanism. Even under the most optimum set of conditions that might favor the "Recommended Project", there can be no guarantee that abortion of the original flood control channel scheme and substitution of a non-flood-control scheme therefor, will assure permanent conversion of private lands to public open space. This last is the crux and main objective of the "Recommended Project": Making of public open space permanently, out of privately owned property.

The present intolerable situation in the Tijuana River Valley, in which the City of San Diego exercises politically-inspired control over land use, and private lands at that, plus the virtual certainty of increased pollutorial flowage over the Valley following full completion of the Mexican channel to the border, must assuredly at some point in the future, explode to that point where correction and relief will be demanded.

Any final Environmental Statement on the "Recommended Project" should recognize the potential for eventual demand for improvements of the type contemplated under the SAN DIEGO 1966 BORDER AREA PLAN; and the best recommendation that can be made at this time, in lieu of a full flood control channel to the ocean, is that any works that might be constructed now, be part and parcel of a master plan that embraces that channel to the Pacific Ocean contained in the authorized original project, as well as optimum use of Tijuana Valley lands for purposes already outlined in the SAN DIEGO 1966 BORDER AREA PLAN.

20 - Some rhetoric in the DES document is lacking in technical backup. This comment does not infer that such data was not furnished in the DES - but rather that the data could not be furnished under any circumstances. It should be made clear this comment DOES NOT apply to engineering design carried out by the US Army/Corps of Engineers - but it does assuredly apply to technical information that has - or might have - relationship to the fish and wildlife situation and the ecological aspects often referred to by objectors to the original flood control channel.

If technical backup is simply not there in the first place, and is

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not supported by incontrovertible evidence, then no amount of narration is sufficient to justify certain irreversible directions that the "Recommended Project" proposes to take.

For instance - both the Federal Government's and the State of California's departments having some responsibilities relating to fish and wildlife resources in the Tijuana River delta and slough[s] and other areas in the nation and the State, have concluded that construction of the authorized flood control channel in the delta of the Tijuana River would "have insignificant effect" upon fish and wildlife in that region [see testimony from both sources under Pages 25A and 25B herein].

Yet in spite of those conclusions by technical experts in their respective fields, there have surfaced other 'experts' who claim oppositely from responsible technicians, and infer construction of the channel would initiate dire consequences for the world of fish and wildlife in the Tijuana River Valley.

Yet it is obvious that both expressions of the situation cannot be correct. Either both are incorrect, or one expression is correct. This reviewer prefers the documented opinion of the Governmental experts on this subject.

[NOTE: It should be understood that attempt to retain permanently, the natural regime in the Tijuana River Valley, under the auspices of the "Recommended Project" [Alternative III-A] is doomed to failure at the time of the first major flood following implementation of the proposed scheme for non-flood-control - because any 50-year, or 75-year design flood would quite likely completely obliterate any fish or wildlife in the Valley; and a Standard Project Flood would guarantee obliteration of all fish and wildlife - with the exception of course, of air-borne life.]

Therefore, the final Environmental Statement - if prepared for the "Recommended Project", should definitely embrace information regarding fish and wildlife, prepared by identified experts in their fields, who at the same time, understand economics and the needs of Mankind.

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21 - The DES states that the City of San Diego rejected the authorized project - including a flood control channel - due to "economic reasons". Yet those economic reasons are not identified. As a matter of fact, neither the City of San Diego, nor any other objector to the original flood control channel scheme, has developed ANY VIABLE ECONOMIC REASON for rejecting the flood control channel concept.

For the past 2½-years - since the City of San Diego aborted the authorized project - this reviewer has attempted to run down the source of an economic reason for non-construction of the channel to the Pacific Ocean. Particularly have these efforts been directed to the office of the Mayor of San Diego, because the Mayor has made these claims to objection due to "economic reasons".

It has turned out that the City of San Diego has made no assessment of the economics involved in the proposals for the "Recommended Project", or for any other alternative to the authorized project.

The City of San Diego has likewise made no assessment of the need for flood control over the valley of the Tijuana River.

The true and overall effects of NOT constructing the channel to the ocean, should be identified in any final Environmental Statement - and that should include the varied economic elements, especially including charts, tables, or whatever might be desirable to support or deny the claim by the City of San Diego, that the original channel scheme was abandoned due to "economic reasons".

22 - Aesthetics is an environmental element. Emasculation of the authorized plan for a flood control channel in the Tijuana River Valley, and proposed substitution therefor of a non-flood-control scheme, has not taken aesthetics into consideration.

The DES document - if finalized for Alternative III-A - should certainly contain several architectural renderings to indicate the very undesirable appearance that will be manifested by: a] Construction of the 23-foot high northerly-trending earthen embankment in such close proximity to the heavily tourist-travelled Interstate Highway 5; and b] Construction adjacent to the community of San Ysidro and to the same Interstate Highway 5, of the huge dissipator facility

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with its 3,650-foot concreted length; its 1,440-foot outlet width; and its tremendous quantity of bare rock riprap on the floor which will contain cavernous interstices to trap and harbor inflowing filth, debris from the streets and sidehills of City of Tijuana, sewage wastes, etc.

This will all be a very definite ADVERSE ENVIRONMENTAL IMPACT due to the "Recommended Project" [Alternative III-A] - and any final Environmental Statement that might be prepared, should thoroughly document that type of impact regarding aesthetics.

23 - One of the factors required by the national environmental policy act made law in January/1970, was that any proposed action [physical action was intended] by the Federal Government that involved "irreversible commitments of resources" should be reported on from an environmental viewpoint.

If we are to take the claims of some environmentalists opposed to the authorized flood control channel for the Tijuana River Valley, in favor of the "Recommended Project", we must agree that if the latter is implemented, that would constitute an "irreversible commitment of resources". This would be because under the "Recommended Project" [Alternative III-A], it would be impossible to ever:

- a] Prevent flooding of the Tijuana River deltaic floodplain;
- b] Prevent creation of a potential for destruction and devastation over 5,200 acres of land, most in private ownership ; and c] Create - via the functional integration of engineering and economic parameters, plus the financial resources of landowners and lending institutions, an improvement in the Tijuana River Valley of such superior, effective, and environmental satisfaction, that San Diego's cultural, educational, and water-oriented beauty could be fully met for generations hence.

Therefore the final Environmental Statement - if written - should embrace carefully considered succinct analyses of the irreversible nature of the non-flood-control scheme upon the Tijuana River delta, and the effects it will exert on the deltaic resources - such as general pollution of land and water areas; complete change of topography following major floods; and eventual loss of existing slough[s]; complete wipeout of vegetation; and backflooding into Mexico, etc.

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24 - The DES document does not explore the subject of overall and comparative economics between alternative project concepts. Especially should the original authorized project concept, and the proposed modified Alternative III-A concept, be shown side-by-side. These comparative economic estimations should positively embrace all estimated tax intakes over the period of project amortization - including costs of essential community services to the project area; intrinsic land values; maintenance; and ALL other fiscal considerations - all regardless of who does what, and where funds may originate. In other words, the true cost of Alternative III-A has not been indicated in the DES, nor has it been analysed fully, objectively, and without prejudice. The final document - if made - should correct these oversights.

The final ES document should also be revised to include full coverage of economic comparisons and evaluations of every other alternative that has been presented in the DES.

The submitted DES only shows estimated costs to put the physical works involved in each of the alternatives, in a state of completion. But by no means are those costs the ONLY cost of a project. On the contrary - in the case of Alternative III-A, the "Recommended Project" - that cost is only a smaller proportion of the true costs that are presently identifiable.

The final Environmental Statement - if made - must positively indicate the true cost of the "Recommended Project" [Alternative III-A] - and that means the FINAL cost of placing the complete concept in its eventual completed state - and it is emphasized, regardless of who pays what, or from what source any funds come for any part of the concept. Especially to be identified would be the costs for purchasing flood-plain lands, now proposed for virtual confiscation from private land-owners by the State of California Department of Parks and Recreation.

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25 - The DES document attempts environmental assessment of the "Recommended Project" [Alternative III-A] via element separation. ALL elements of an environmental assessment must be considered in various relationship to each other. In other words, considered as a chain-reacting complex.

Piecemeal assessment, such as rodents alone; plants alone; fish alone; topography alone; economics alone; people alone; water alone, etc - has not resulted in this instance, in a viable overall environmental assessment that can lead to a viable overall project decision.

26 - The DES document has attempted reaching for an easy answer, based, in part, on insufficiently-developed technological criteria. Ostensibly - the DES objective has been to justify a previous political decision by indicating superficial and non-effective interest in environmental and social economics, and by frequently overdone narration concerning environmental elements that in this instance are relatively unimportant to the main issue.

Some of the DES's environmental assessments regarding the "Recommended Project" seem to extend known technology into presently unknown and/or non-perfected and uncertain fields of environmental standards.

The DES document appears to give the impression that it is part of a conspiracy to take the spotlight off the real objective of the "Recommended Project", which is: Virtual confiscation without just compensation, of private lands for vague purposes concerned with so-called 'public use', including assisting in creation of a monstrous and autonomous State Department of Parks and Recreation empire.

Thus, confusion within the DES document and its various assumptions, deductions, and conclusions, was not only possible, but virtually assured. Insignificant environmental impacts are 'ballooned' into psuedo-significance and given values greater than worth.

If we are concerned enough to want to create a playground for rodents that will cost over TWO HUNDRED MILLION DOLLARS [\$200,000,000.] - then we must be concerned too, with what happens as a result of that action - to the rodents - as well as to the people from whom the playground land must be stolen.

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27 - Deannexation proceedings are currently under way that embrace the "Recommended Project" area, plus all remaining lands in the Tijuana River Valley, as well as some contiguous lands.

Successful deannexation action can result in removing the City of San Diego from its present position of jurisdictional influence over the project area, and as a consequence, rendering consideration of any alternative to the original authorized project for a flood control channel to the Pacific Ocean, completely irrelevant.

The final Environmental Statement - if ever prepared - should give some recognition to the deannexation probability and if it should be successful, there might be an opportunity to place the already approved and fully financed flood control channel under immediate construction.

28 - More or less summing the most prominent characteristics of the DES document are:

- a] Partially developed rationalizations;
- b] Underestimation of costs of the "Recommended Project" - as well as for alternatives to that project;
- c] 'Blowing-up' and over-emphasis on certain natural phenomena which occur in the Tijuana River floodplain only rarely - and are actually minor in nature due to that rarity;
- d] Non-realization of the necessity for flood control in the delta of the Tijuana River;
- e] Attempt to environmentally justify the "Recommended Project", which is unjustifiable from any environmental standpoint; and
- f] Lack of detailed description - with graphic presentation - of the SAN DIEGO 1966 BORDER AREA PLAN and its place in the environmental assessment.

The original authorized project to construct a flood control channel and improvements in the Tijuana River Valley is without precedent in the San Diego region for its vastness of concept; its tremendous array of public benefits; its cost amortization ability; its usefulness to the present population and infinite future generations; and its overall environmental enhancement of a hitherto environmentally worthless and environmentally unstable region - a veritable environmental desert; yet all those factors and those benefits have been essentially ignored in the DES.

E N D



**Pacific
Legal
Foundation**

455 Capitol Mall, Suite 465 • Sacramento, California 95814 • Telephone (916) 444-0154

July 24, 1974

District Engineer
United States Army
Corps of Engineers
Los Angeles District
Post Office Box 2711
Los Angeles, California 90053

Dear Sir:

In re: Draft Environmental Statement Tijuana River
Flood Control Project, January, 1974

The Pacific Legal Foundation, a nonprofit, public interest law foundation, has reviewed the above-referenced draft environmental statement, and based upon such review, submits the following comments for your consideration.

The National Environmental Policy Act of 1969 (NEPA) is an environmental full disclosure law. The NEPA impact statement is meant to assure that a decisionmaker has before him and takes into account all possible consequences of any project.^{1/} At the very minimum, NEPA requires that the proposed project be discussed in terms of the benefits as contrasted to the environmental risks.^{2/} As Judge J. Skelly Wright stated in Calvert Cliffs Coordinating Committee, Inc. v. United States Atomic Energy Commission (449 F.2d 1109, 1113 (1971)), "NEPA requires a finely tuned and systematic balancing analysis in each instance." The Pacific Legal Foundation questions the sufficiency of the draft statement on two bases. First, it would seem difficult to provide the precise and balanced analysis required by NEPA until the recommended project design is completed. We are informed the recommended project design is still at a tentative stage and are therefore uncertain that the major cost-benefit

^{1/} See Environmental Defense Fund v. Corps of Engineers, 325 F.Supp. 749, 759 (ED Ark. 1971), and Calvert Cliffs v. AEC, 449 F.2d 1109, 1114 (DC Cir. 1971).

^{2/} Natural Resources Defense Council, Inc. v. Morton, 458 F.2d. 827, 833 (1972).

District Engineer
July 24, 1974
Page 2

factors to be balanced have been considered in the draft statement. Second, the Foundation believes that the draft statement provides an inadequate discussion of the adverse environmental impacts incident to the proposed project.

1. Project Design - The Levee System

One of the purposes of the environmental impact statement and the individualized balancing analysis is to ensure, with possible alteration, that the optimally beneficial action is ultimately taken. (Calvert Cliffs, supra, at p. 1123.) Needed alterations can only be suggested if the plan is fully explained. Although the project design is not yet completed, it is difficult to discern from the statement exactly what is contemplated in terms of the levee or dike system. This aspect of the design assumes a high degree of importance because the adequacy of the levees determine whether or not the conclusory statements in the draft regarding the prevention of floodwaters from backing into Mexico (Statement, p. 3, para. 7(c)), fulfillment of international commitments (Statement, p. 15, para. 66), and flood protection (e.g., Statement, p. 15, para. 68) will be borne out.

We note that discussion of the levee system is limited to paragraph 7(c) on page 3 of the Statement and the drawing provided on plate 2. Neither the discussion in paragraph 7(c) nor the drawings in plate 2 contain sufficient technical data to allow a realistic appraisal of the system's effectiveness by an expert. It is suggested, therefore, that more design detail be included to describe the levee system.

The Draft Statement does indicate that the levees are to be built from excavated materials removed from the channel and energy dissipator site. Reports indicate that the valley floor consists of:

"A continuous layer of coarse gravel and cobbles 10 to 35 feet thick overlain by a surface deposit of sand and silt that varies in thickness from 50 feet at the upper end of the valley to a maximum of 90 feet at the lower end. The total depth of the valley fill in the lower part of the valley is about 100 feet...." (See report, "Proposed International Flood Control Project United States and Mexico: Tijuana River Basin in California and Baja California," July 1965, appendix 2, page 21, and Draft Statement, page 2.)

It would appear that due to the erodable nature of the soils in the area that the levees should be reinforced. There is an indication in plate 2 that there will be some riprap protection on the side-

District Engineer
July 24, 1974
Page 3

slopes of the levees. Data as to the depth of the riprap is not provided however. (This would appear to be an important factor to an expert who would be evaluating the effectiveness of the plan.) There is some doubt that reliance on riprap for protection of earth levees against floodwaters is justifiable. See the March, 1974 issue of Civil Engineering--ASCE at pp. 68-70 (attached), wherein there is a discussion of the Mill Creek, Lytle-Cajon Creeks and Banning Levee projects in the California counties of San Bernardino and Riverside. It was concluded in the Civil Engineering article at page 70 that "recent experiences demonstrate the inadequacy of non-rectilinear soft-bottom flood control channels in this [Southern California] area and particularly those on steep alluvial cones." The Tijuana River Valley reportedly slopes from fifty feet above sea level to sea level in five and one-half miles and therefore apparently qualifies as a "steep slope" area. The possibility of the earth dike or levees breaching under flood conditions with cross channel or diagonal flowage or parallel flowage along embankment toes is thus raised. It is kept in mind that there can be no assurance that the flood flows emerging from the dissipator will spread uniformly across the river delta. The composition of the proposed dikes or levees together with the information regarding earth dikes in other southern regions of the state, thus justify raising the possibility of failure.

In keeping with the purpose of the Draft Statement and in the interest of insuring that the optimally beneficial action is taken, it is suggested that the design regarding the levee or dike system be reconsidered and that any increased costs due to another mode of reinforcement (e.g., steel sheet piling) be set out in the final impact statement. In the alternative, if there is no modification of the levee design, it is suggested that the risks and dangers involved in the present design be evaluated and discussed in the final statement.

2. Adverse Environmental Impacts

Assuming, for discussion purposes, that the present project design will provide limited flood protection, the Foundation suggests that the draft report does not provide an adequate discussion of adverse environmental impacts. (Compare paragraph 36 of the Draft Statement Summary to the following comments.)

(a) Encephalitis-Carrying Mosquitos

The recommended plan provides that floodwater and sediment will pass through the channel and dissipator and will discharge into the unprotected lower Tijuana River Valley. It must be expected, therefore,

District Engineer
July 24, 1974
Page 4

that the sedimentation area and the rest of the flood plain will, from time to time, be covered with pools of stagnate water. (Numerous depressions and pockets characterize the topographic configuration of the Tijuana Valley.) The statement does not consider the effects of this condition on the environment. It is submitted, however, that the ponds of stagnate water will provide excellent breeding grounds for the encephalitis-carrying mosquito which has already been identified in the Border Field area. (See San Diego Union, March 18, 1973, page B.3.) Dr. J. B. Askew, San Diego County Health Director, has stated that all that is required for the encephalitis virus to spread throughout the area is an increase in the mosquito population. The ponds in the flood plain area could potentially provide the breeding ground for the increased mosquito population which could make the virus a real threat to the surrounding population.

We note with concern that in many areas of California, the encephalitis-carrying mosquito has become resistant to virtually all pesticides. (Science News, volume 103, No. 23, page 371, June 9, 1973). The seriousness of the potential adverse effects flood plain ponds may have on the environment is thus realized even in the very narrow context of the mosquito problem. Further consideration and evaluation of this problem and other problems created by the vast flood plain is thus warranted in the final draft statement.

(b) Solid Waste Pollution

We also note with concern the inadequate and conclusory nature of the discussion of the water and solid waste pollution aspects of the project. (See Draft Statement, page 11, paragraphs 47 and 49.) It appears that the statement on page 12, "[a]s no sanitary sewers will discharge to the Tijuana River, and the sewer system is being expanded, the possibility of flood runoff including domestic sewage is minimal and limited to flood borne contributions from rural areas", is subject to dispute and based largely on expected actions on behalf of the Mexican government.

Joseph N. Barry, Environmental Specialist, California Regional Water Quality Control Board, San Diego Region, in a memorandum (attached) dated June 6, 1974, disputes the statement that the possibility of flood runoff, including domestic sewage is minimal and limited to flood-borne contributions from rural areas. He states:

District Engineer
July 24, 1974
Page 5

"In the City of Tijuana, chronic problems with overflowing and broken sewer lines result in sewage discharges to the Tijuana River. These sewage discharges ... presently result in contaminated water, public health hazards, and general degradation of water quality in the United States. If these discharges should reach the Tijuana Estuary, they may contribute to eutrophication and reduce the oxygen resources within the estuary."

Reports indicate that sewage discharge in the Tijuana region of Mexico is increasing at a rapid rate. (See Chapter VIII of "A Report to the Commission of the Californias on Tijuana, Baja California Sewage Discharges," prepared by the California Regional Water Quality Control Board, San Diego Region, January 10, 1973.) It is noted further that while paragraph 49 on page 11 of the report states that Tijuana provides sewer service to most of its population, the Mexican Department of Public Works has stated that presently only forty-five percent of Tijuana is served by sewers.^{3/}

It is apparent from the information discussed in this section of our comments that the draft report oversimplifies its discussion of water and solid waste pollution and that the discussion is misleading. While Mexico may have programmed sewer system expansion, very little is known concerning the implementation of such plan; the facts indicate that the sewer system is inadequate to meet present needs. The possibility of flood runoff including domestic sewage, therefore, may be far greater than the estimated "minimal," and it is apparent that contributions will not be limited to rural areas. This crucial health factor warrants more detailed and factual analysis in the final statement.

We are grateful for the opportunity to comment on the draft statement and wish to thank Robert S. Joe, Chief, Environmental Resources Branch for the copy sent to us. It is realized that quantifying the benefits and environmental costs is a difficult task. Nevertheless, in light of the importance of the proposed

^{3/}One known inadequacy of the Mexican sewer system in the border area of Baja, California is that of treatment facilities. There is a notable dependence on San Diego Metropolitan Sewage Treatment system as indicated in Tables III and IV of the above-mentioned Regional Water Quality Control Board Report.

District Engineer
July 24, 1974
Page 6

project to the South Bay Area, every effort must be made to evaluate all known possible consequences. We believe the comments provided herein deserve your most serious consideration.

Very truly yours,

Thomas E. Hookano

THOMAS E. HOOKANO
Attorney
For the Pacific Legal Foundation

Attachments

POMONA COLLEGE
CLAREMONT, CALIFORNIA 91711

DEPARTMENT OF ZOOLOGY
SEAFER LABORATORY

12 June 1974

District Engineer
U. S. Army Corps of Engineers
Los Angeles District
P. O. Box 2711
Los Angeles, California 90053

Dear Sir:

Thank you for sending me a copy of "Draft Environmental Statement, Tijuana River Flood Control Project, San Diego County, California," dated January 1974. I appreciate the opportunity to comment on the proposed project and on the draft environmental statement. I trust that my comments will be made part of the permanent record.

Let me state at the outset that this is surely the best environmental impact statement I've seen coming from the Los Angeles District office. Obviously, the quality of this statement is due to the massive revisions necessitated by the controversies surrounding the originally proposed project, that concrete channel going all the way to the ocean. The original proposal was wretched, resulting as it would in the complete destruction of the Tijuana Estuary and the urbanization of the entire flood plain. Both these grievous consequences are avoided in the current proposed project. Apparently the City of San Diego is in large part responsible for forcing these significant changes in the project, settling instead for flood plain management. San Diego is to be saluted for its progressive thinking and responsible planning, evidenced so clearly in paragraphs #62-63, and 67-70 of the draft environmental statement.

I am a professional ecologist, with particular research expertise in estuaries, and with considerable experience with many California estuaries. My chief criticisms of the ecological aspects of the draft environmental statement are (1) that the tables and discussions do not really deal with the relative abundances of animal and plant species present, and (2) that there is no real discussion of biotic communities, their composition and structure. A footnote to Table 9 states that only common species are listed, but there is no indication in the text (e.g., #29-38) that there are sure to be many more kinds of organisms, both plants and animals, present, and that some of these are bound to be important. This problem is common to almost all environmental impact statements I have read, and not just those of the Corps of Engineers. But I do wish that some serious attention would be paid to biotic communities! While in most cases, the

the species composing these communities may not themselves be rare or endangered, certainly the salt marsh community, the mud-flat community, the lowland riparian community are all endangered. The difference is important, and the situation should be addressed. Endangered communities must be considered along with endangered species.

The several paragraphs (#37-38) devoted to endangered species are quite good and to the point. I particularly liked the inclusion of certain endangered plants, almost always ignored in such discussions. Somehow, we officially worry only about vertebrates, usually warm and furry ones. This is tunnel vision. One small correction: the Belding's race of the Savannah Sparrow has just been added to the State list of endangered species. The newly revised edition of "At the Crossroads" (California Department of Fish and Game) singles out Tijuana Estuary and Marsh as being particularly critical to the continued survival of this species which, like several others mentioned in paragraph #37, is entirely dependent upon the salt marsh.

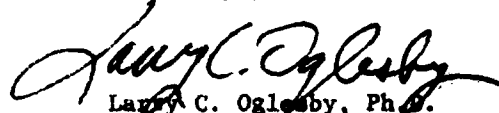
I should add that there is a considerable number of incorrectly spelled scientific names in Tables 3 through 9.

The various discussions throughout the draft environmental statement make it clear that some sort of channelization of the American portion of the Tijuana River is necessary, both because of treaty obligations, and because the high velocity of water discharged from the Mexican channel would degrade an unchannelized American stream. However, no justification is given for why the proposed concrete channel and energy dissipator, in total extending for nearly 3/4 mile downstream from the border, are to be placed in the specific locations indicated. Why not, for example, start the energy dissipator right at the international border? Careful placement of the dissipator here would reduce the total linear and areal extent of the project, thus preserving even more of the "excellent riparian vegetation" near Dairy Mart Road (Paragraph #30). Furthermore, re-positioning the necessary north levee close to Interstate 5 and San Ysidro would mean that far fewer than 370 acres would be lost to the flood plain. These 370 acres, it is candidly admitted in several locations in this statement, will be subject to rapid urbanization. If I read the draft statement properly (paragraph #10), 2/3 of the "benefits" of the entire project are due to "increased land utilization," that is, to enhancement of assessed valuation of land once it is no longer subject to flood plain zoning. Thus, while it is really admirable that this project plans to leave nearly 4,200 acres in a natural situation fully subject to whatever floods may occur on this heavily dammed and controlled stream, no real justification is given for protecting these 370 acres, as yet unbuilt, "protecting" them in a way that will assure their loss as natural areas. I am no engineer, and there may well be excellent engineering reasons why, if the project is to be built at all, it must be built in this particular way and in this particular location. But these reasons are not given in this draft environmental statement, and I regard this as a serious omission.

As I have indicated several times, there is much to applaud in this statement. I single out, in particular, the acknowledgement of the importance of an estuary when permitted to remain in a reasonably natural condition, subject to tides and occasional flooding, and maintaining its natural biological communities, which include both salt marshes and mud flats. The forthright adoption of flood plain management as a viable alternative to building expensive concrete channels is as startling as it is commendable, in view of the number of previous Corps of Engineers' environmental impact statements which dismiss flood plain management as politically infeasible and economically impractical. Again, the City of San Diego is to be congratulated for such far-sighted city planning, and the Corps of Engineers is to be congratulated for being flexible enough to go along with the City's progressive ideas.

In summary, the basic premises on which this project operates are excellent, and should be applied in many other situations. I do have some reservations about the overall quality of the ecological discussions, even though I agree with the conclusions. And I have some serious concerns about the actual location of the project within the Tijuana River floodplain, for I could not find any justification given for why the project channels and energy dissipator are so long, nor why the levees must be built in such a way as to remove some 370 acres from the floodplain, acreage which will immediately be urbanized. These considerations should be included in the final environmental impact statement.

Sincerely yours,



Larry C. Oglesby, Ph.D.
Associate Professor of Zoology

copies: Mayor Pete Wilson, City of San Diego
Mr. D. D. McNealy, Executive Officer, International Boundary and
Water Commission
Senator Alan Cranston
Senator John Tunney
National Audubon Society
Sierra Club, Angeles Chapter

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

P. O. Box 1019, Davis, CA 95616

June 13, 1974

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
P. O. Box 2711
Los Angeles, California 90053

Dear Sir:

Review of the draft environmental statement "Tijuana River Flood Control Project, San Diego County, California" by Soil Conservation Service personnel has been completed. The statement provides an accurate and relatively thorough treatment of impacts predictable from the various alternatives discussed. Considerations within the realm of Soil Conservation Service expertise and responsibility appear to have received adequate attention.

We feel that of alternatives explored, the one selected offers the minimum adverse environmental consequences. Assuredly some treatment appears in order to offset adverse effects of increased velocities and channel flows resulting from the channel lining in progress in Mexico.

The proposed construction is not within the borders of an existing Resource Conservation District and should not effect current or planned programs of the Soil Conservation Service in San Deigo County. We appreciate the opportunity provided for review and comment.

Sincerely,

G. H. Stone

for G. H. STONE
State Conservationist

cc: Don Miller, SCS, Riverside





DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE

50 FULTON STREET
SAN FRANCISCO, CALIFORNIA 94102

OFFICE OF
THE REGIONAL DIRECTOR

Office of Environmental Affairs

June 11, 1974

D. D. McNealy
Executive Officer
International Boundary and
Water Commission
United States and Mexico
P.O. Box 20003
El Paso, Texas 79998

Dear Mr. McNealy:

The draft Environmental Impact Statement for the Tijuana River Flood Control Project has been reviewed in accordance with departmental procedures as required by Section 102(2)(c) of the National Environmental Policy Act, (PL 91-190).

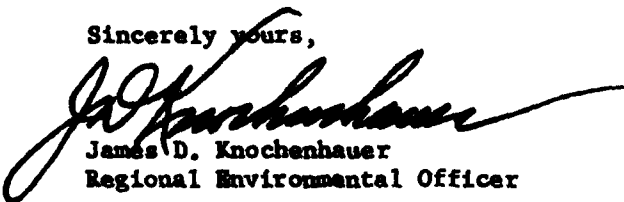
The proposed action involves the construction of a short concrete lined channel, a 3,650 foot long energy dissipator and about 7,000 feet of levees. The channel will connect with and be an extension of a similar channel now under construction in Mexico.

The statement indicates that future development in the flood plain will generally be limited to agricultural, recreational or other open-space activities. There is, at this time at least, little pressure for expansion of population into this area. Protection of San Ysidro is highly desirable, as is the reduction in sewage, trash, litter and other waste products which have previously been dumped into the Tijuana River Channel.

Our review does not indicate any significant problems related to the concerns of this department and we have no comments or suggestions to offer.

The opportunity to review this statement was appreciated.

Sincerely yours,



James D. Knochenhauer
Regional Environmental Officer

cc: P. Hayes
W. Muir

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION-REGION ~~9~~ ~~10~~ ~~11~~ ~~12~~

ARIZONA
CALIFORNIA
HAWAII
NEVADA

450 Golden Gate Avenue, Box 36096, San Francisco, Calif. 94102

June 4, 1974

IN REPLY REFER TO:
9ED



Colonel John V. Foley
District Engineer
Department of the Army
Los Angeles District
Corps of Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Colonel Foley:

We have reviewed the Draft Environmental Impact Statement for the Tijuana River Flood Control Project in San Diego County, California, and have no comments to offer at this time.

We appreciate this opportunity to review the subject Draft EIS.

Sincerely yours,

For
F. E. Hawley
Regional Administrator



**DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD**

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20000
PHONE: (202) 426-2262

• JUN 10 1974

District Engineer
Department of the Army
Los Angeles District, Corps of
Engineers
P. O. Box 2711
Los Angeles, California 90053

Dear Sir:

This is in response to a letter dated 1 May 1974 from the International Boundary and Water Commission, El Paso, Texas, concerning a draft environmental impact statement for the Tijuana River Flood Control Project, San Diego County, California. The Commission requested that we respond directly to you.

The Department of Transportation has reviewed this draft statement. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

R. I. PRICE
Rear Admiral, U. S. Coast Guard
Chief, Office of the Environment
and Systems

COMPREHENSIVE PLANNING ORGANIZATION OF THE SAN DIEGO REGION



SUITE 524
SECURITY PACIFIC PLAZ
1200 THIRD AVENUE
SAN DIEGO, CALIF. 92101
(714) 233-5211

June 20, 1974

Mr. J. F. Friedkin
United States Commissioner
International Boundary and Water Commission
United States & Mexico - U. S. Section
200 1 BWC Building
4110 Rio Bravo
El Paso, Texas 79998

Subject: Draft EIS Tijuana River Flood Control Project, San Diego
County, CA.

Dear Mr. Friedkin:

The above draft EIS has been received by the San Diego Comprehensive Planning Organization as provided for in the A-95 review procedures adopted by the CPO Board of Directors.

The CPO Board of Directors, on June 17, 1974, passed a resolution stating that your draft environmental impact statement is consistent with the regional CPO policy on the Tijuana Flood Plain contained in the Initial Coastline Plan and is a fully documented analysis on the environmental impacts associated with the construction of the project.

Also in compliance with the above-stated procedures, a copy of the CPO staff report is enclosed along with the resolution.

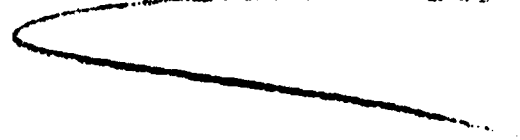
Sincerely,


RICHARD J. HUFF
Executive Director

RJH:j

Enclosure

Attachments





Project Applications

Item No.: A-FY74-33

Date June 17, 1974

To: Board of Directors
 From: Executive Director
 Re: Draft EIS - Tijuana River Flood Control Project*

Introduction

The International Boundary and Water Commission has submitted a revised draft environmental impact statement (EIS) concerning the construction of flood control facilities in the Tijuana River flood plain within the United States near the international border with Mexico. The recommended plan includes (a) 300 feet of concrete-lined trapezoidal channel; (b) a 3,650-foot long energy dissipator; and (c) about 7,000 feet (1.3 miles) of levees. The total cost of the project is \$12,195,000.

This draft EIS has been prepared for the United States Section of the International Boundary and Water Commission by the U.S. Army Corps of Engineers and covers the environmental impacts associated with the flood control project as adopted by the City of San Diego on October 31, 1972. At that time San Diego City Council considered six alternatives with a wide range of land uses and associated flood control facilities and subsequently adopted a plan for flood control facilities that would essentially retain the present land uses of the Tijuana estuary and the agricultural areas in the lower Tijuana River valley. Based on staff review it is my

RECOMMENDATION

That the Board of Directors of the CPO support the draft Environmental Impact Statement as being consistent with the regional CPO policy on the Tijuana Flood Plain contained in the Initial Coastline Plan as a fully documented analysis on the environmental impacts associated with the construction of the project.

Basis for Recommendation

Staff analysis of the draft EIS finds the discussion of the environmental impacts associated with the proposed project to be adequately presented. On April 15, 1974 the CPO Board of Directors adopted relevant policies for this area in the Initial Coastline Plan including the following:

"The regional policy regarding the Tia Juana Valley should be to build a flood control system sufficient to meet the international treaty with Mexico, protect life and property in the 1973 existing urbanized area

*"Tijuana" is the spelling used by the International Boundary and Water Commission and the 1944 water treaty between the United States and Mexico.

from the dangers of flooding and health hazards caused by polluted water, and preserve the estuary and its wildlife habitat. The International Boundary and Water Commission and the Corps of Engineers should show specifically as part of the environmental impact statement that any system proposed by them will clearly satisfy these requirements. Flood plain zoning will be applied as part of the flood control system."

Staff believes the conditions of the regional policy are met by the current proposal and adequately addressed in the draft EIS.

Discussion

1. One important element in the CPO policy on the Tijuana Flood Plain is that any flood control system should satisfy the United States obligation to Mexico. The draft EIS states:

"The project will fulfill our international commitment to Mexico and allow Mexico to complete its channel to the international boundary. The project will provide flood protection to some land in the United States and prevent backwater flooding into the City of Tijuana in Mexico while reducing floodwater velocities coming from Mexico's concrete-lined channel to the presently uncontrolled conditions in the natural channel." (page 3)

2. A second important element is that existing urbanized areas in the cities of San Diego and Imperial Beach be protected from flooding. In the draft EIS the Corps makes the following points:

"Construction of a 3,650-foot-long energy dissipator with grouted stone and dumped stone will reduce peak discharge water velocity of 29 feet per second to about 12 feet per second, the present uncontrolled velocity in the natural channel." (page 2)

"The proposed project will reduce the flow velocities from Mexico and discharge the flow into the United States at about the same velocity as would exist under natural conditions. The channel and flood plain downstream from the intersection of the low flow channel will remain in a status quo condition. Flood flows will continue to scour the unimproved stream channel and pick up and transport sand and sediment to the ocean, through the Tijuana estuary. About 4,210 acres of flood plain (excluding project rights-of-way) will still be vulnerable to flooding." (page 15)

"Occasional flood damage to agricultural land, recreational facilities, public improvements and the estuary will occur; however, urbanized portions of the Cities of Imperial Beach and San Diego located along the flood plain perimeter will not be endangered by the lack of flood protection." (page 15)

"Of 618 people living in the 4,800-acre flood plain study area, 450 live immediately west of Interstate 5 within the San Ysidro community. The coastal community of Imperial Beach, located at the northwest perimeter of the lower Tijuana River valley, has a population of 21,400 (January 1, 1973 estimate). No residents of this community live within the standard project flood overflow area." (page 10)

3. Another concern of the CPO Board was the potential danger of polluted water flowing from Mexico into the United States. In this regard the following statements are made in the draft EIS:

"The City of Tijuana's sanitary sewer system previously served only a portion of the city. During the period 1969 to 1973 the city has expanded its system by the addition of 148 miles of sewerlines and now provides service to most of the population, with further expansion planned. Prior to initiation of construction on Mexico's flood control channel, the area in the flood plain was not served by sewers, and during floods, there was a possibility that flood overflows could transport sewage from privies. This flood plain area has now been cleared as part of the channel construction and the redeveloped area will be served by sewers. Mexico also has programmed clearing of the flood plain upstream from this constructed channel. As no sanitary sewers will discharge to the Tijuana River, and the sewer system is being expanded, the possibility of flood runoff including domestic sewage is minimal, and limited to flood borne contributions from rural areas." (page 11)

"The project will not directly influence the quality of runoff water being delivered from Mexico onto the United States flood plain. However, Mexico does not intend to permit disposal of trash or other wastes into their completed channel; thereby, reducing the possibility of waste products polluting the United States flood plain. Also, Mexico is considering plans to extend the channel construction further upstream to the confluence of Cottonwood Creek. If this occurs, it will further limit the use of the flood plain in Mexico by low income families and reduce the possibility of pollutants being thrown or discharged into the river channel. Such action should further minimize the potential for pollution of the United States flood plain." (page 19)

4. The last item was that the flood control system should preserve the estuary and its wildlife habitat. The Corps makes the following statements regarding this subject in the draft EIS:

"Unlike most salt marshes in the state, which have been destroyed or severely damaged by harbor construction and pollution, this marsh is one of the few high quality salt water marshes without development remaining along the California coastline. Its high quality results from rapid tidal flushing and the relative absence of pollution. Saltwater enters the estuary during tidal flows, producing a circulating system that keeps the salinity level fairly constant even during seasonal runoff flows. Because of its salt content, the estuary is inhabited by fish and invertebrates that are rarely found in fresh or brackish water. Since the early 1960's freshwater flows into the estuary have occurred infrequently. Great volumes of fresh water, as occur during heavy floods, will kill many salt water species in the estuary; however, infrequent flooding may be beneficial on a long-term basis because the floodwater brings nutrient-rich sediments which are valuable to marine organisms in the estuary." (page 8)

"Protection of the estuary as well as other natural resources, is a San Diego Regional and City planning goal. The project will not have any direct environmental impact upon the estuary because existing runoff and sedimentation conditions will be sustained. Estuarine plant and animal life will remain vulnerable to reduced salinities during heavy runoff or flooding." (page 18)

"The project will not change the normal aging process for the estuary. If sedimentation jeopardizes the long-term productivity of the estuary, then some solution, such as dredging, might be applied. However, dredging has the short-term effect of destroying marine organisms which may not reappear for several years. Because the estuary has survived natural flooding in the past, it probably can survive natural flooding again, without any artificial help." (page 26)

The City of Imperial Beach has prepared a response to the draft EIS which we have attached to this report for your information. The City of San Diego has indicated that a response to the draft EIS is currently in preparation and will be transmitted directly to the U.S. Army Corps of Engineers.


RICHARD J. HUFF

Attachment

COMPREHENSIVE PLANNING ORGANIZATION OF THE SAN DIEGO REGION



SUITE 524
SECURITY PACIFIC PLAZA
1200 THIRD AVENUE
SAN DIEGO, CALIF. 92101
(714) 233-5211

RESOLUTION #74-78

ADOPTED ON June 17, 1974

RECOMMENDING SUPPORT OF THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT PRE-
PARED ON THE TIJUANA RIVER FLOOD
CONTROL PROJECT

WHEREAS, the International Boundary and Water Commission has submitted a revised draft environmental impact statement (EIS) concerning the construction of flood control facilities in the Tijuana River flood plain within the United States near the International border with Mexico; and

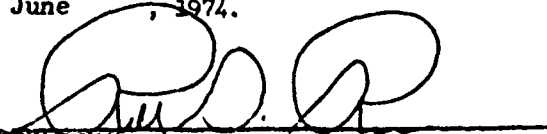
WHEREAS, the Comprehensive Planning Organization acting as the Areawide Planninghouse for the San Diego Region pursuant to regulations set forth in the Office of Management and Budget Circular A-95 has reviewed the environmental impacts associated with the project and discussed in the draft environmental impact statement; and

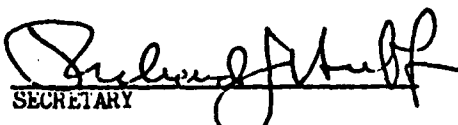
WHEREAS, the CPO Board believes the conditions of the regional policy (discussed in the attached report) adopted by CPO on April 15, 1974 are met by the current proposal and adequately addressed in the draft EIS: NOW THEREFORE

BE IT RESOLVED that the Board of Directors of the Comprehensive Planning Organization does support the draft EIS as adequately presenting the environmental impacts associated with the Tijuana Flood Control Project and as meeting the conditions of CPO adopted regional policy as described below.

"The regional policy regarding the Tia Juana Valley should be to build a flood control system sufficient to meet the international treaty with Mexico, protect life and property in the 1973 existing urbanized area from the dangers of flooding and health hazards caused by polluted water, and preserve the estuary and its wildlife habitat. The International Boundary and Water Commission and the Corps of Engineers should show specifically as part of the environmental impact statement that any system proposed by them will clearly satisfy these requirements. Flood plain zoning will be applied as part of the flood control system."

PASSED AND ADOPTED by the Board of Directors of the Comprehensive Planning Organization this 17th day of June, 1974.


CHAIRMAN

Attest: 
SECRETARY

MEMBER AGENCIES: Cities of Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Imperial Beach, La Mesa, National City, Oceanside, San Diego, San Marcos, Vista and County of San Diego / EX OFFICIO MEMBER: California Department of Transportation / HONORARY MEMBER: Tijuana, B. C.A.

OFFICE OF ECONOMIC OPPORTUNITY

EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20506

MAY 9 1974

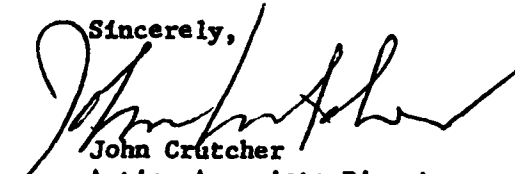
Mr. D. D. McNealy
Executive Officer
International Boundary and Water Commission
United States and Mexico
200 IEWC Building, 4110 Rio Bravo
El Paso, Texas 79998

Dear Mr. McNealy:

We have forwarded the draft environmental statement for the Tijuana River Flood Control Project, San Diego County, California, to our Regional Office in San Francisco. At that point it will be reviewed and comments, if any, will be forthcoming.

Thanking you for giving us the opportunity to review this paper, I remain

Sincerely,



John Crutcher
Acting Associate Director
for Program Review

cc: Dr. Eugene Gonzales
Regional Director, OEO IX
100 McAllister Street
San Francisco, California 94102

PHOTOS



PHOTO 1. Looking west at the lower Tijuana River valley study area. Interstate 5 is viewed in right center. The City of Tijuana is the heavily urbanized area.

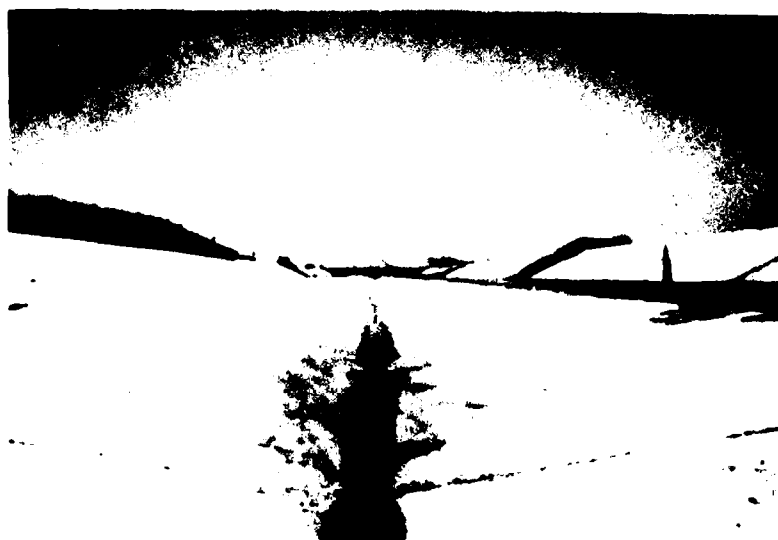


PHOTO 2. Looking east at the 230-foot-wide concrete channel constructed in Mexico.



PHOTO 3. From the Tijuana River channel in California looking northeast at low grasses and annual vegetation in the flood plain adjacent to the channel and at San Ysidro in the background.



PHOTO 4. Large riparian vegetation in Tijuana River channel about 1-1/2 miles downstream from the United States-Mexican border near Dairy Mart Road.

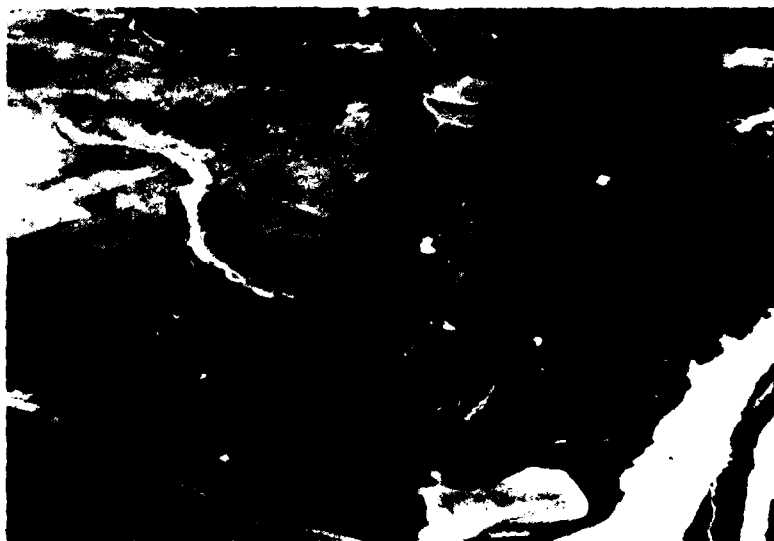


PHOTO 5. Looking southeast at the Tijuana River and estuary.



PHOTO 6. Agricultural land uses predominate in lower Tijuana River valley.



PHOTO 7. Looking northwest at Mexican litter and trash deposited in the United States by the Tijuana River. Note the IBWC San Ysidro Gaging Station.

TABLES

TABLE 1

Annual Runoff in Acre-Feet in the Lower Tijuana River Valley 1937-1975

Year	Nestor Gage*	Boundary Gage**
1937	66,530	
1938	49,670	
1939	19,590	
1940	11,010	
1941	332,700	
1942	25,020	
1943	17,270	
1944	106,500	
1945	15,200	
1946	7,110	
1947	2,280	
1948	588	2,930
1949	5,280	6,820
1950	153	2,470
1951	0	82
1952	19,880	19,820
1953	0	85
1954	2,880	4,130
1955	0	441
1956	0	0
1957	36	100
1958	2,290	2,930
1959	93	0
1960	134	0
1961	0	0
1962	68	507
1963	6	289
1964	0	127
1965	553	2,570
1966	2,260	2,970
1967	214	753
1968	41	207
1969	3,750	6,230
1970	47	688
1971	0	152
1972	0	362
1973	66	1,250
1974	54	781
1975***	50	989

* Records published by U.S. Geological Survey.

** From International Boundary and Water Commission data.

*** Preliminary data IBWC.

TABLE 2

**Water Table Fluctuations in Selected Wells in the
Lower Tijuana River Valley***

19S/02W-04A06 S. California American Water Company near Nestor

Date	Water level in relation to sea level (ft.)
February 1961	-8.6
February 1962	-6.5
February 1963	-8.6
February 1964	-8.9
February 1965	-8.6
March 1966	+0.8
March 1967	+2.2
March 1968	+2.9
April 1969	+6.5
March 1970	+3.9
March 1971**	+4.2

19S/02W-01N01 S. near San Ysidro

Date	Water level in relation to sea level (ft.)
February 1961	+7.8
February 1962	-18.0
February 1963	-18.0
February 1964	-0.2
February 1965	+2.3
March 1966	+5.8
March 1967	+11.4
March 1968	+13.9
April 1969	+17.9
March 1970	+16.4
March 1971**	+14.5

* From unpublished records of the U.S. Geological Survey.

** Measurements discontinued in 1971.

TABLE 3

Vegetation in the Riparian Habitat
Along or Within the Tijuana River Channel

TREES

Common Name	Scientific Name
Eucalyptus	<i>Eucalyptus</i> sp.
Fremont cottonwood*	<i>Populus fremontii</i>
Screwbean mesquite	<i>Prosopis pubescens</i>
Slender willow*	<i>Salix exigua</i>
California black willow*	<i>Salix gooddingii</i>
Pepper tree	<i>Schinus molle</i>
Five-stamened tamarisk*	<i>Tamarix pentandra</i>

PERENNIAL SHRUBS

Giant reed	<i>Arundo donax</i>
Mexican devil-weed	<i>Aster spinosus</i>
Wingscale saltbush	<i>Atriplex canescens</i>
Chaparral broom	<i>Baccharis sarothroides</i>
Mule fat	<i>Baccharis viminea</i>
Beach evening primrose	<i>Camissonia cheiranthifolia</i>
California croton*	<i>Croton californicus</i>
California buckwheat	<i>Eriogonum fasciculatum</i>
Burrobush	<i>Fraseria dumosa</i>
Goldenbush	<i>Haplopappus venetus</i>
Desert fragrance*	<i>Hymenoclea monogyra</i>
San Diego poverty weed	<i>Iva hayesiana</i>
Spiny rush	<i>Juncus acutus</i>
Anderson's desert thorn	<i>Lycium andersonii</i>
Tree tobacco	<i>Nicotiana glauca</i>
Shore cactus	<i>Opuntia littoralis</i>
Arrow-weed	<i>Pluchea sericea</i>
Sugarbush	<i>Rhus ovata</i>
Castor bean	<i>Ricinus communis</i>
Elderberry	<i>Sambucus mexicana</i>
Three-square-bulrush	<i>Scirpus americanus</i>
Olney bulrush	<i>Scirpus olneyi</i>
Shrubby butterweed*	<i>Senecio douglasii</i>
Black nightshade	<i>Solanum nodiflorum</i>

TABLE 3 (Continued)

PERENNIAL HERBS

Common Name	Scientific Name
Common ragweed	<i>Ambrosia psilostachya</i>
Australian saltbush	<i>Atriplex semibaccata</i>
Watson saltbush R	<i>Atriplex watsonii</i>
Brass-bottons	<i>Cotula coronopifolia</i>
Jimsonweed	<i>Datura meteloides</i>
Salt grass	<i>Distichlis spicata</i>
Sweet fennel	<i>Foeniculum vulgare</i>
Fragrant everlasting	<i>Gnaphalium beneolens</i>
White hoarhound	<i>Marrubium vulgare</i>
Hottentot-fig	<i>Mesembryanthemum edule</i>

ANNUALS

Tumbleweed	<i>Amaranthus albus</i>
Tumbling pigweed	<i>Amaranthus graecizans</i>
Red orache	<i>Atriplex rosea</i>
Field mustard*	<i>Brassica campestris</i>
Black mustard	<i>Brassica nigra</i>
White goosefoot	<i>Chenopodium album</i>
Mexican tea	<i>Chenopodium ambrosioides</i>
Garland chrysanthemum	<i>Chrysanthemum coronarium</i>
Dewplant	<i>Cryophytum crystallinum</i>
Western field dodder	<i>Cuscuta campestris</i>
Western sunflower	<i>Helianthus annuus</i>
Seaside heliotrope	<i>Heliotropium curassavicum</i>
Telegraph weed	<i>Heterotheca grandiflora</i>
Common tomato	<i>Lycopersicum esculentum</i>
White sweet clover	<i>Melilotus albus</i>
Annual beardgrass	<i>Polypogon monspeliensis</i>
Golden dock	<i>Rumex fueginus</i>
Russian thistle*	<i>Salsola pestifer</i>
Hairy nightshade	<i>Solanum sarrachoides</i>
Common sow thistle	<i>Sonchus oleraceus</i>
Salt marsh sandspurry	<i>Spergularia marina</i>
Virgate stephanomeria	<i>Stephanomeria virgata</i>
Canada cocklebur	<i>Xanthium strumarium</i>

*abundant species

R - locally rare occurrence

TABLE 4

Partial List of Birds Observed Near the Tijuana River Channel

Common Name*

Grebe, pied-billed	Flicker, red-shafted
Heron,	Phoebe,
great blue	Black
green	Say's
Egret,	Jay, scrub
common	Horned lark
cattle	Bushtit, common
Duck, ruddy	Wren, Bewick's
Hawk,	Mockingbird, northern
red-tailed	Thrasher, California
marsh	Robin, American
sparrow	Gnatcatcher, Black-tailed
Quail, California	Pipit, water
Coot, American	Shrike, loggerhead
Killdeer	Starling, common
Willet	Warbler,
Yellowlegs, lesser	Audubon's
Sandpiper,	Wilson's
spotted	House sparrow
western	Meadowlark, western
least	Blackbird, Brewer's
Stilt, black-necked	House finch
Gull,	Goldfinch, lesser
Glaucous-winged	Towhee
ring-billed	Green
Dove,	rufous-sided
rock	brown
mourning	Sparrow,
Roadrunner, greater	savannah
Owl, burrowing	white-crowned
Hummingbird, Anna's	golden-crowned
	song

*Common names recognized by the American Ornithological Union

TABLE 5

Animals Which Inhabit or Visit the Lower Tijuana River Valley

AMPHIBIANS

Common Name	Scientific Name
Pacific tree frog	<i>Hyla regilla</i>

REPTILES

Alligator lizard	<i>Gerrhonotus multicarinatus</i>
Coast horned lizard	<i>Phrynosoma coronatum</i>
Granite spiny lizard	<i>Sceloporus orcutti</i>
Side-blotched lizard	<i>Uta stansburiana</i>
Great basin fence lizard	<i>Sceloporus occidentalis</i>
Gopher snake	<i>Pituophis melanoleucus</i>
Southern Pacific rattlesnake	<i>Crotalus viridis</i>
Red diamond rattlesnake	<i>Crotalus ruber</i>

MAMMALS

Opossum	<i>Didelphis marsupialis</i>
Blacktailed jackrabbit	<i>Lepus californicus</i>
Brush rabbit	<i>Sylvilagus bachmani</i>
Desert cottontail rabbit	<i>Sylvilagus audubonii</i>
California ground squirrel	<i>Citellus beecheyi</i>
Valley pocket gopher	<i>Thomomys bottae</i>
Little pocket mouse	<i>Perognathus longimembris</i>
San Diego pocket mouse	<i>Perognathus fallax</i>
California mouse	<i>Peromyscus californicus</i>
Cactus mouse	<i>Peromyscus eremicus</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Coyote	<i>Canis latrans</i>
Raccoon	<i>Procyon lotor</i>
Long-tailed weasel	<i>Mustela frenata</i>
Bobcat	<i>Lynx rufus</i>
Badger	<i>Taxidea taxus</i>
Striped skunk	<i>Mephitis mephitis</i>

TABLE 6

Vegetation in the Tijuana River Salt Marsh and Estuary

GREEN ALGAE

Common Name	Scientific Name
Sea lettuce	<i>Ulva latissima</i> <i>Cladophora</i> sp <i>Enteromorpha</i> sp

MONOCOTS

Soft chess	<i>Bromus mollis</i>
Ripgut grass	<i>Bromus rigidus</i>
Red brome	<i>Bromus rubens</i>
Salt marsh grass	<i>Distichlis spicata</i>
Wild barley	<i>Hordeum murinum</i>
Spiny rush	<i>Juncus acutus</i>
Salt cedar	<i>Monanthochloe littoralis</i>
Sickle grass	<i>Parafolis incurva</i>
California bulrush	<i>Scirpus californicus</i>
Alkali bulrush	<i>Scirpus robustus</i>
Cord grass	<i>Spartina foliosa</i>
Arrow grass	<i>Triglochin maritima</i>
Eel grass	<i>Zostera marina</i>

DICOTS

Beach sand verberna	<i>Abronia umbellata</i>
Amblyopappus	<i>Amblyopappus pusillus</i>
California sagebrush	<i>Artemisia californica</i>
Saltbush	<i>Atriplex canescens</i>
Australian saltbush	<i>Atriplex semibaccata</i>
Watson saltbush R	<i>Atriplex watsonii</i>
Saltwort	<i>Batis maritima</i>
Sea rocket	<i>Cakile edentula</i>
Beach evening primrose	<i>Oenothera cheiranthifolia</i>
Salt marsh bird's beak T	<i>Cordylanthus maritimus</i>
Aklaki weed	<i>Cressa truxillensis</i>
Salt marsh dodder	<i>Cuscuta salina</i>
Coastal buckwheat	<i>Eriogonum fasciculatum</i>
Alkali heath	<i>Frankenia grandifolia</i>
Beach sand bur	<i>Franseria chamissonis</i>
Goldenbush	<i>Haplopappus venetus</i>
Seaside Heliotrope	<i>Heliotropium curassavicum</i>
Southern poverty weed	<i>Iva hayesiana</i>

TABLE 6 (Continued)

Common Name	Scientific Name
Jaumea	<i>Jaumea carnosa</i>
Sea lavender R	<i>Limonium californicum</i>
Deerweed	<i>Lotus scoparium</i>
California box-thorn	<i>Lycium californicum</i>
Sea fig	<i>Mesembryanthemum chilense</i>
Ice plant	<i>Mesembryanthemum crystallinum</i>
Hottentot fig	<i>Mesembryanthemum edule</i>
Little ice plant	<i>Mesembryanthemum nodiflorum</i>
Coastal prickly pear	<i>Opuntia occidentalis</i>
San Diego cholla	<i>Opuntia serpentia</i>
Salt marsh feabane	<i>Pluchea purpurascens</i>
Annual pickleweed R	<i>Salicornia bigelovii</i>
Glasswort	<i>Salicornia subterminalis</i>
Pickleweed	<i>Salicornia virginica</i>
Salt marsh sand spurrey	<i>Spergularia marina</i>
California sea-blite	<i>Suaeda californica</i>
Torrey sea-blite	<i>Suaeda torreyana</i>
Tamarisk	<i>Tamarix</i> sp.
R - locally rare	
T - threatened	

TABLE 7

Partial List of Birds Frequenting the Tijuana River Salt Marsh and Estuary

Common Name

Loon, common arctic	Turnstone, ruddy
Grebe, horned eared	Snipe, common
Pelican, brown	Dowitcher, short-billed
Cormorant, double-crested Brandt's	Dowitcher, long-billed
Heron, great blue green Louisiana black-crowned night	Knot
Egret, common	Sanderling
Egret, snowy	Dunlin
Bittern American	Phalarope, Wilson's northern
Duck, mallard	Gull, glaucous-winged western herring California ring-billed mew
Gadwall	Bonaparte's
Teal, green-winged	Heerman's
Teal, cinnamon	Tern, Forster's common least royal elegant caspiian
Widgeon, american	Dove, mourning
Shoveler	Roadrunner
Scaup, lesser	Owl, barn burrowing short-eared
Bufflehead	Flicker, red-shafted
Scoter, surf	Phoebe, black Say's
ruddy duck	Horned lark
Merganser, red-breasted	Swallow, tree cliff
Kite, white-tailed	Raven
Hawk, red-tailed	Wren, Bewick's long-billed marsh
Eagle, golden marsh	
Osprey	
Falcon, prairie	
Falcon, peregrine	
sparrow	
Rail, clapper black	
Coot, American	
Stilt, black-necked	

TABLE 7 (Continued)

Avocet
Plover,
 semipalmated
Killdeer
 snowy
 black-bellied
Sandpiper,
 least
 spotted
 western
Godwit, marbled
Whimbrel
Curlew, long-billed
Yellowlegs, greater
Yellowlegs, lesser
Willet

Mockingbird
Pipit, water
Shrike, loggerhead
Warbler,
 Audubon's
 Yellowthroat
Meadowlark, western
Blackbird, red-winged
Finch, house
Towhee, brown
Sparrow,
 savannah
 sage
 white-crowned
 golden-crowned
 song

TABLE 8

Fishes and Cephalochordates Inhabiting the Tijuana River Estuary

Common Name	Scientific Name
Barred surfperch	<i>Amphistichus argenteus</i>
Slough anchovy	<i>Anchoa delicatissima</i>
Topsmelt	<i>Atherinops affinis</i>
California lancelet	<i>Branchiostoma californiense</i>
Arrow goby	<i>Clevelandia ios</i>
Shiner perch	<i>Cymatogaster aggregata</i>
California killifish	<i>Fundulus parvipinnis</i>
White croaker	<i>Genyonemus lineatus</i>
Longjaw mudsucker	<i>Gillichthys mirabilis</i>
Opaleye	<i>Girella nigricans</i>
Walleye surfperch	<i>Hyperprosopon argenteum</i>
Bay Blenny	<i>Hypsoblennius gentilis</i>
Diamond turbot	<i>Hypsopsetta guttulata</i>
Checkspot goby	<i>Ilypnus gilberti</i>
Pacific staghorn sculpin	<i>Leptocottus armatus</i>
California corbina	<i>Menticirrhus undulatus</i>
Striped mullet	<i>Mugil cephalus</i>
Bat stingray	<i>Myliobatis californicus</i>
Kelp bass	<i>Paralabrax clathratus</i>
Spotted sand bass	<i>Paralabrax maculatofasciatus</i>
Sand bass	<i>Parabrax nebulifer</i>
California halibut	<i>Paralichthys californicus</i>
Spotted turbot	<i>Pleuronichthys ritteri</i>
Slim midshipman	<i>Porichthys myriaster</i>
Shadow goby	<i>Quietula y-cauda</i>
Shovelnose guitarfish	<i>Rhinobatos productus</i>
Bay pipefish	<i>Syngnathus leptorhynchus</i>
Tonguefish	<i>Symphurus atricauda</i>
Round stingray	<i>Urolophus halleri</i>

TABLE 9

Invertebrates in the Tidal Channels and Adjacent
Intertidal areas of the Tijuana River Estuary*

ECHINOID ECHINODERMS

Common Name	Scientific Name
Common sand dollar	<i>Dendraster excentricus</i>

SIPUNCULID WORMS

Iridescent peanut worm	<i>Sipunculus nudus</i>
------------------------	-------------------------

POLYCHAETE WORMS

Joint worm	<i>Axiiothella rubrocincta</i>
Parchment tubeworm	<i>Chaepopterus variopedatus</i>
Shell tubeworm	<i>Diopatra ornata</i>
Bloodworm	<i>Glycera dibranchiata</i>
Orbinid polychaete	<i>Haploscoloplos elongatus</i>
	<i>Nephtys</i> spp.
Red mudworm	<i>Notomastus tenuis</i>
	<i>Ophelia limocina</i>
Sand tubeworm	<i>Owenia fusiformis</i>

BIVALVE MOLLUSCS

Wavy chione	<i>Chione undatella</i>
False mya	<i>Cryptomya californica</i>
Wedge clam	<i>Donax californicus</i>
	<i>Florimeta ohsa</i>
Eggshell clam	<i>Laevicardium substriatum</i>
Bentnose clam	<i>Macoma nasuta</i>
White sand clam	<i>Macoma secta</i>
Bay mussle	<i>Mytilus edulis</i>
Native oyster	<i>Ostrea lurida</i>
Common little neck clam	<i>Protothaca staminea</i>
Purple clam	<i>Sanguinolaria nuttalli</i>
Washington clam	<i>Saxidomus nuttalli</i>
California jackknife clam	<i>Tagelus californianus</i>
Gaper clam	<i>Tresus nuttalli</i>

TABLE 9 (Continued)
GASTROPOD MOLLUSCS

Common Name	Scientific Name
Sea hare	<i>Aplysia californica</i>
Gould's bubble shell	<i>Bullaria gouldiana</i>
California horn shell	<i>Cerithidea californica</i>
Salt marsh snail	<i>Melampus olivaceus</i>
Channeled nassa	<i>Nassarius fossatus</i>
Mud nassa	<i>Nassarius tegula</i>
Striped sea slug	<i>Navanax inermis</i>
Beatic olivella	<i>Olivella bactica</i>
Purple olivella	<i>Olivella biplicata</i>
Lewis' moon snail	<i>Polinices lewisii</i>

DECAPOD CRUSTACEANS

Ghost shrimp	<i>Callinassa californiensis</i>
Mole crab	<i>Emerita analoga</i>
Cancer crab	<i>Cancer</i> sp.
Mudflat crab	<i>Hemigrapsus oregonensis</i>
Purple shore crab	<i>Pachygrapsus crassipes</i>
Pea crab	<i>Scleroplax granulata</i>
Fiddler crab	<i>Uca crenulata</i>

* Presence determined by samples taken during 1970 or reported by Bybee. Table does not list many smaller invertebrate species.

TABLE 10

Unique, Rare, Endangered or Threatened Plants and Animals
of the Lower Tijuana River Valley and Estuary

PLANTS

Unique or anomalous occurrence

Common Name	Scientific Name
Century plant	<i>Agave shawii</i>
Cactus	<i>Begocactus emoryi</i>
Live-forever	<i>Dudleya attenuata</i>
Frankenia	<i>Frankenia palmeri</i>
Franseria	<i>Franseria chenopodiifolia</i>
Oligomeria	<i>Oligomeris linifolia</i>
Screw-bean mesquite	<i>Prosopis pubescens</i>
Desert mallow	<i>Sphaeralcea ambigua</i>

Threatened species

Salt marsh bird's beak	<i>Cordylanthus maritimus</i>
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ANIMALS

Endangered species

Peregrine falcon	<i>Falco peregrinus</i>
Light-footed clapper rail	<i>Rallus longirostris</i>
Brown pelican	<i>Pelecanus occidentalis</i>
California least tern	<i>Sterna albifrons</i>
Belding's savannah sparrow	<i>Passerculus sandwichensis</i>

Rare species

Black rail	<i>Laterallus jamaicensis</i>
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Locally rare

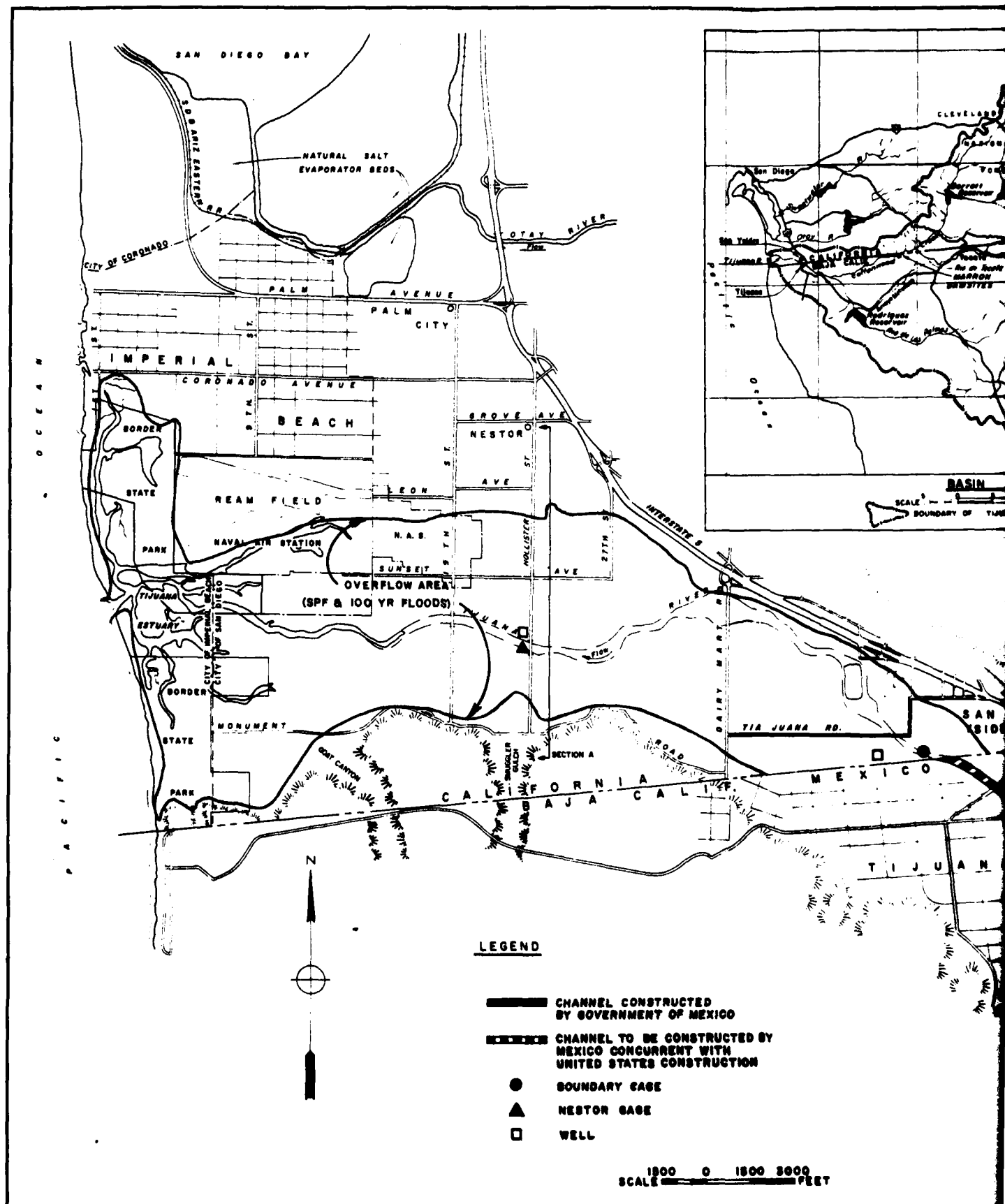
Snowy plover	<i>Charadrius alexandrinus</i>
White-tailed kite	<i>Elanus leucurus</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Western Burrowing Owl	<i>Speotyto cunicularia</i>

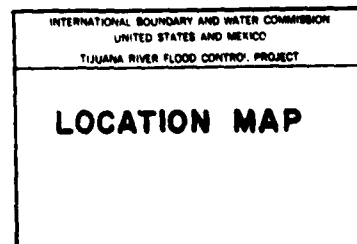
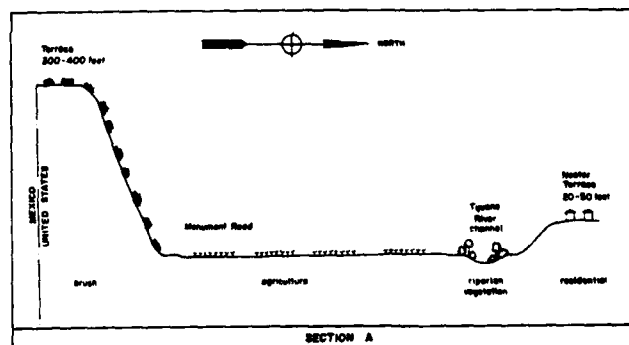
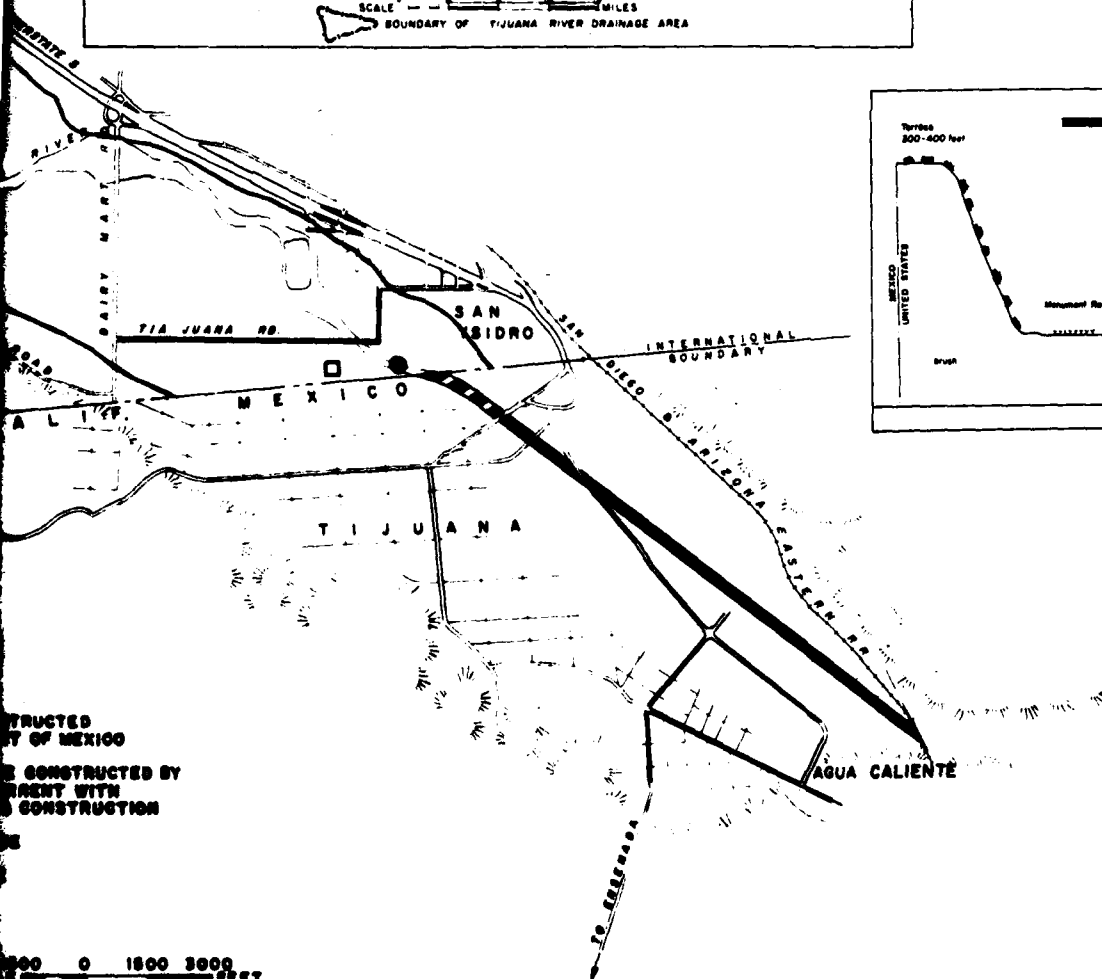
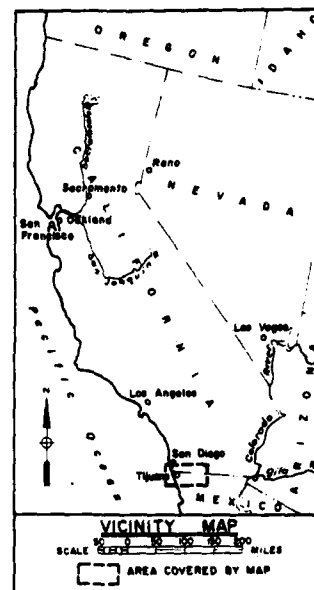
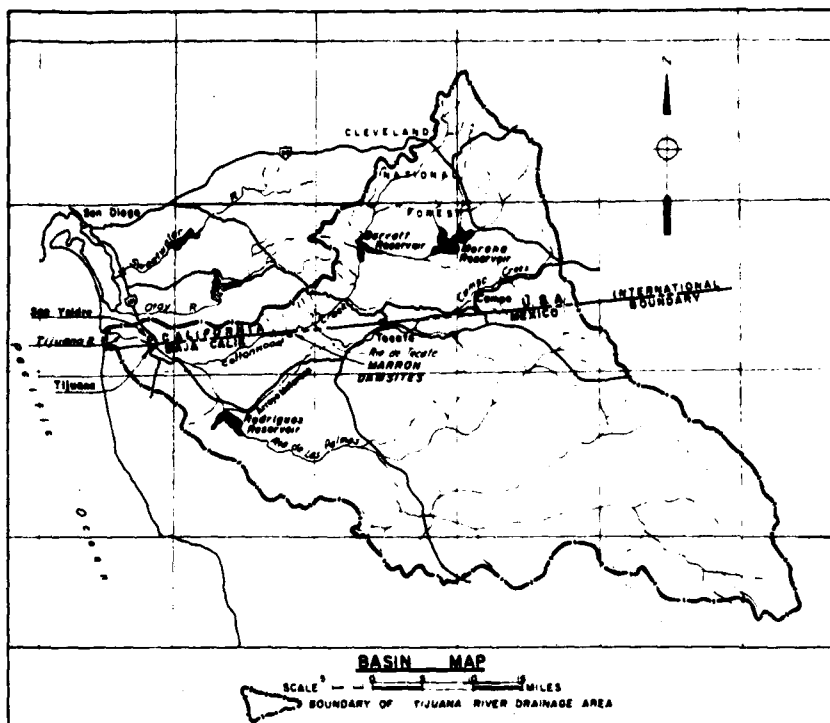
Endangered Plant - in danger of extinction throughout all or part of range.

Threatened Species - likely to become extinct within the foreseeable future throughout all or a significant portion of their range.

Rare Species - a small population exists within its range.

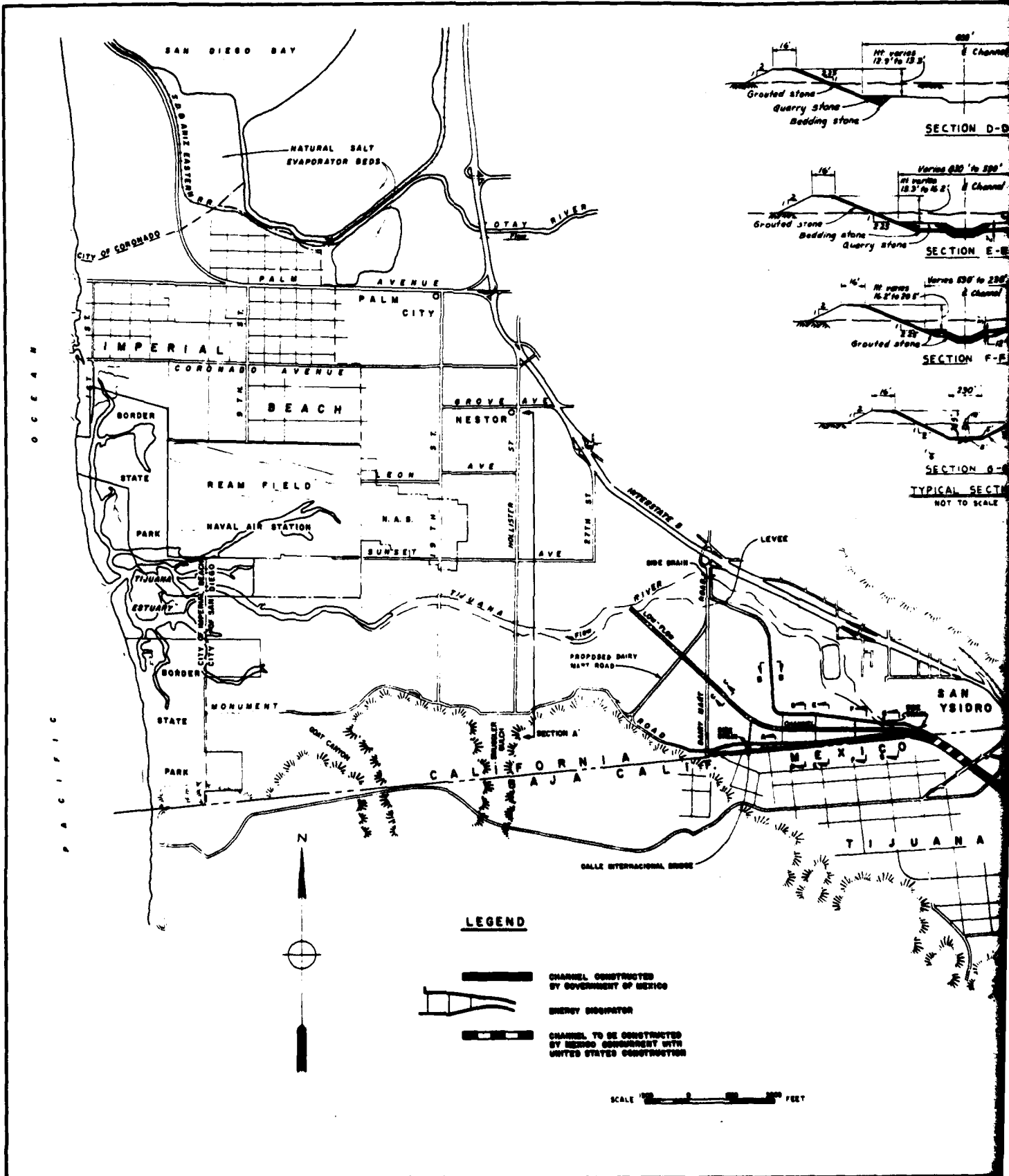
PLATES

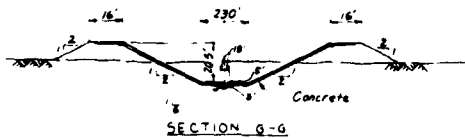
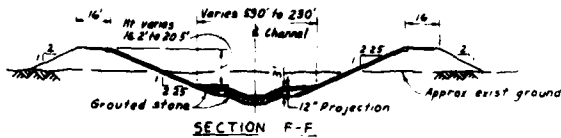
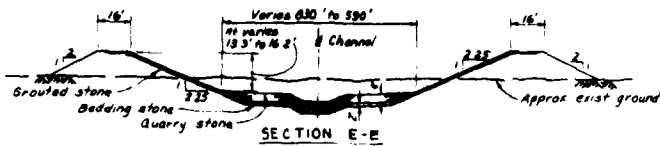
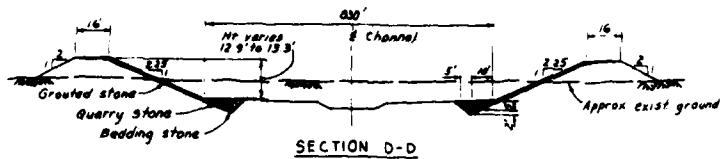




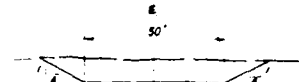
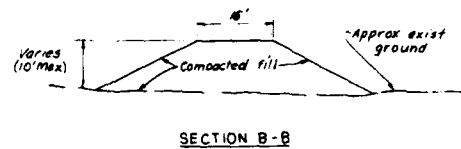
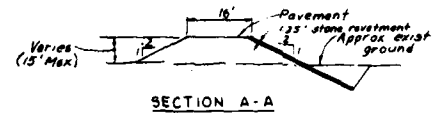
CONSTRUCTED
BY MEXICO
CONSTRUCTED BY
MEXICO WITH
CONSTRUCTION

0 1000 2000 3000
FEET

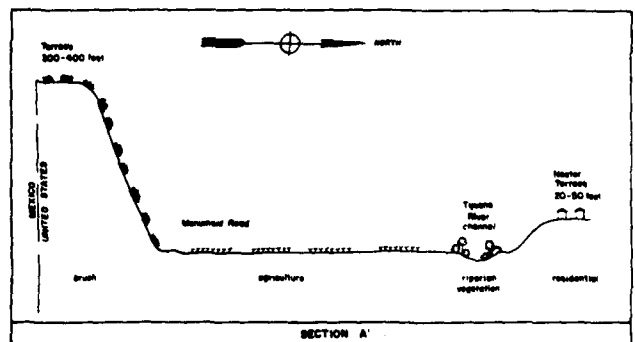
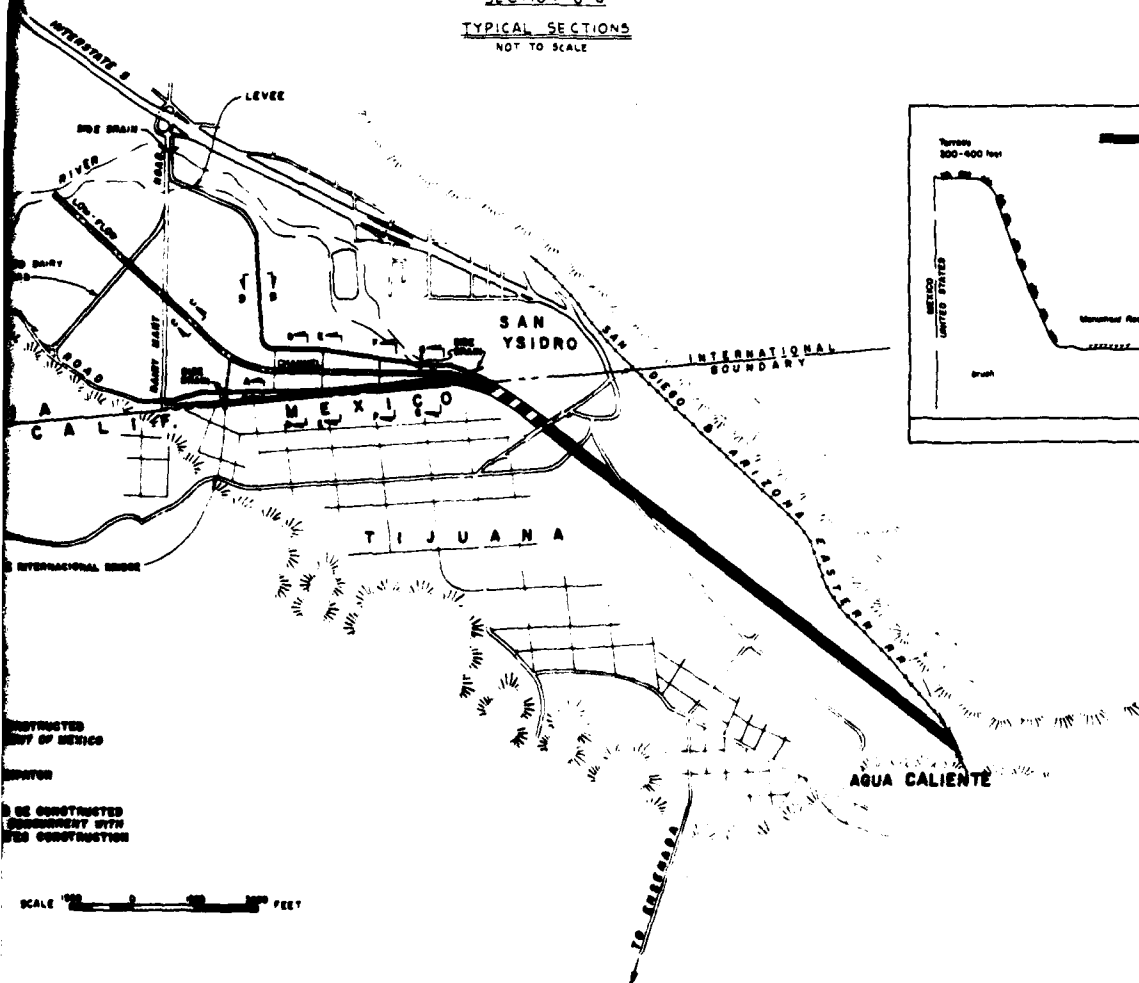








TYPICAL SECTIONS
NOT TO SCALE

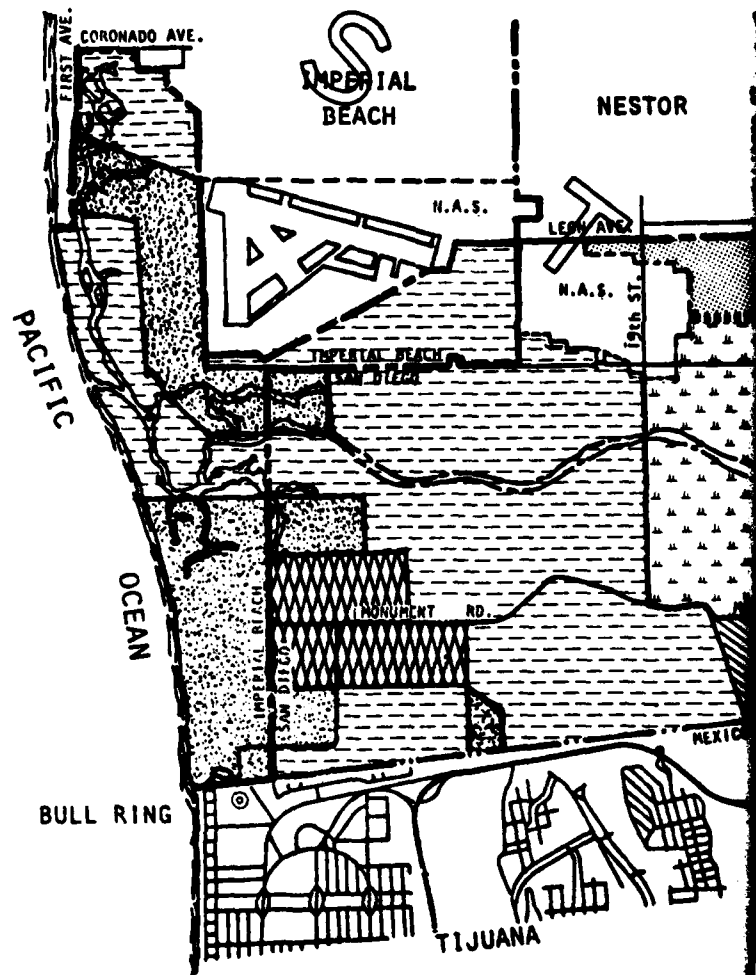


TYPICAL SECTIONS
NOT TO SCALE



INTERNATIONAL BOUNDARY AND WATER COMMISSION UNITED STATES AND MEXICO TIJUANA RIVER FLOOD CONTROL PROJECT
PROPOSED PLAN
LEVEED ENERGY DISSIPATOR

-  LOW DENSITY RESIDENTIAL
-  LOW-MEDIUM
-  COMMERCIAL
-  COMMERCIAL RECREATION



TAKEN FROM THE JANUARY 1978 TIA JUANA RIVER VALLEY PLAN
AND ENVIRONMENTAL IMPACT REPORT

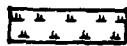
PREPARED BY THE CITY OF SAN DIEGO

LOW DENSITY RESIDENTIAL

LOW-MEDIUM

COMMERCIAL

COMMERCIAL RECREATION



AGRICULTURE



INDUSTRIAL



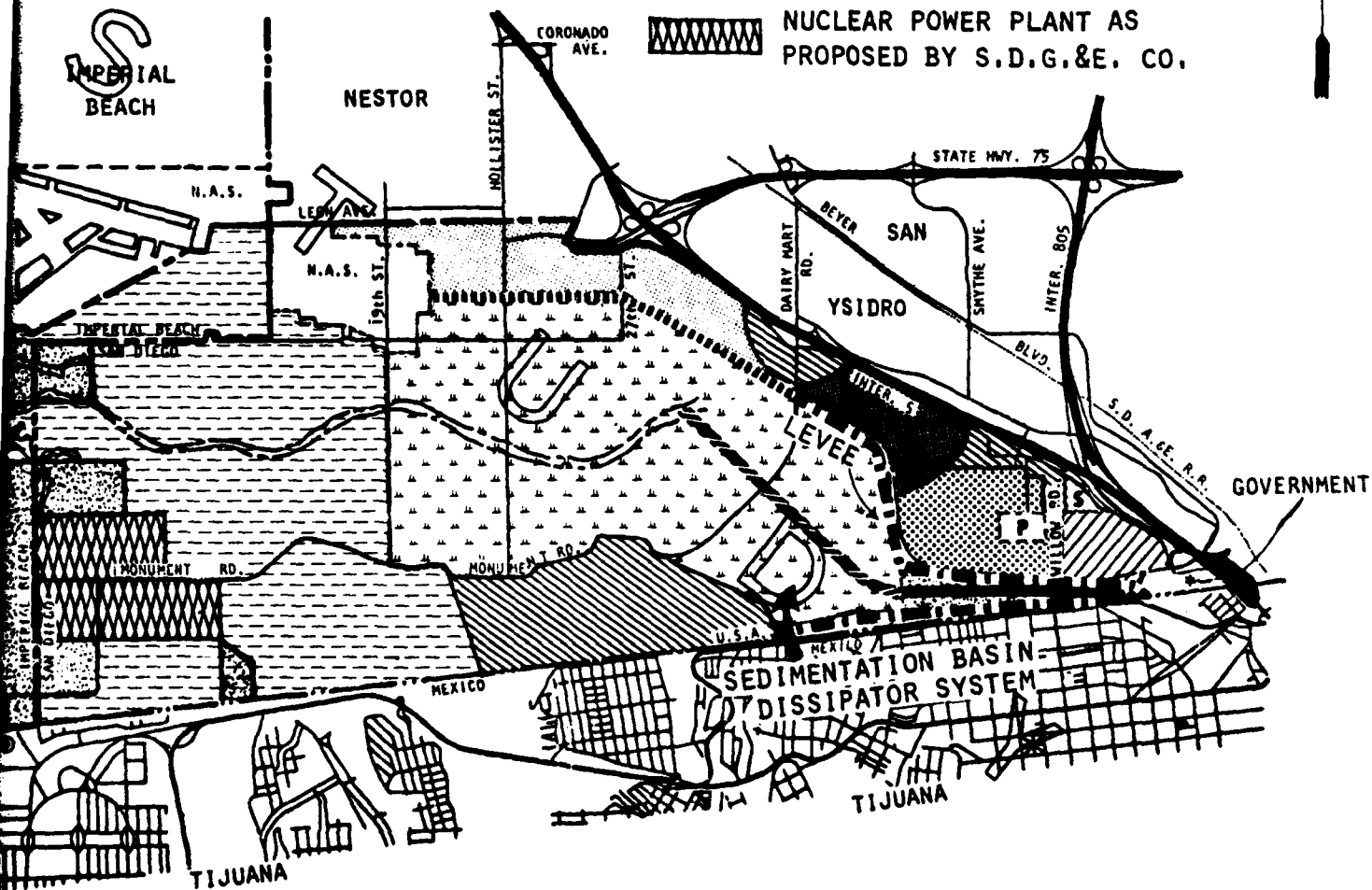
EXISTING BORDER FIELD



PROPOSED BORDER FIELD



NUCLEAR POWER PLANT AS PROPOSED BY S.D.G.&E. CO.



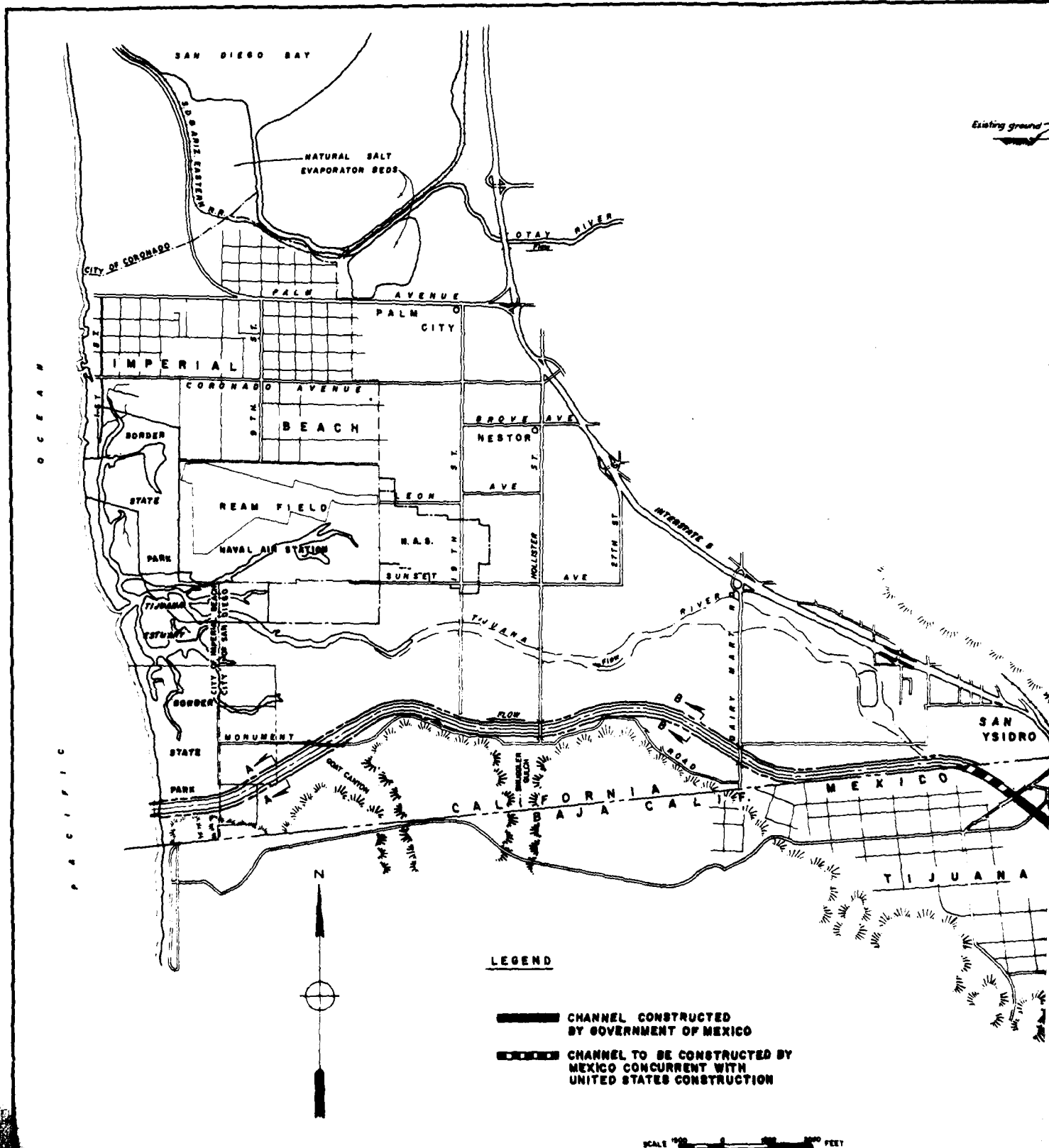
JANUARY 1978 TIA JUANA RIVER VALLEY PLAN
IMPACT REPORT

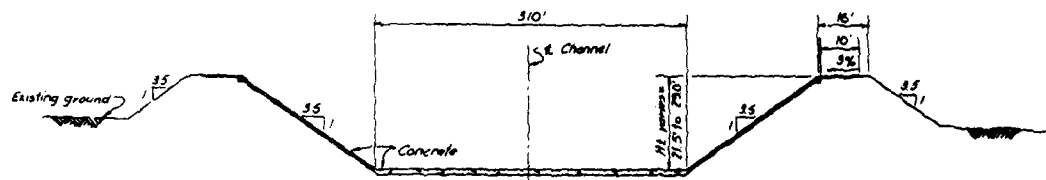
CITY OF SAN DIEGO

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TIJUANA RIVER FLOOD CONTROL PROJECT

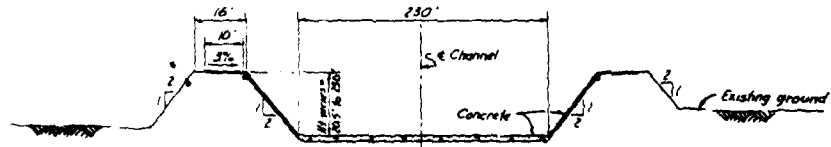
TIA JUANA RIVER VALLEY PLAN

PLATE 3

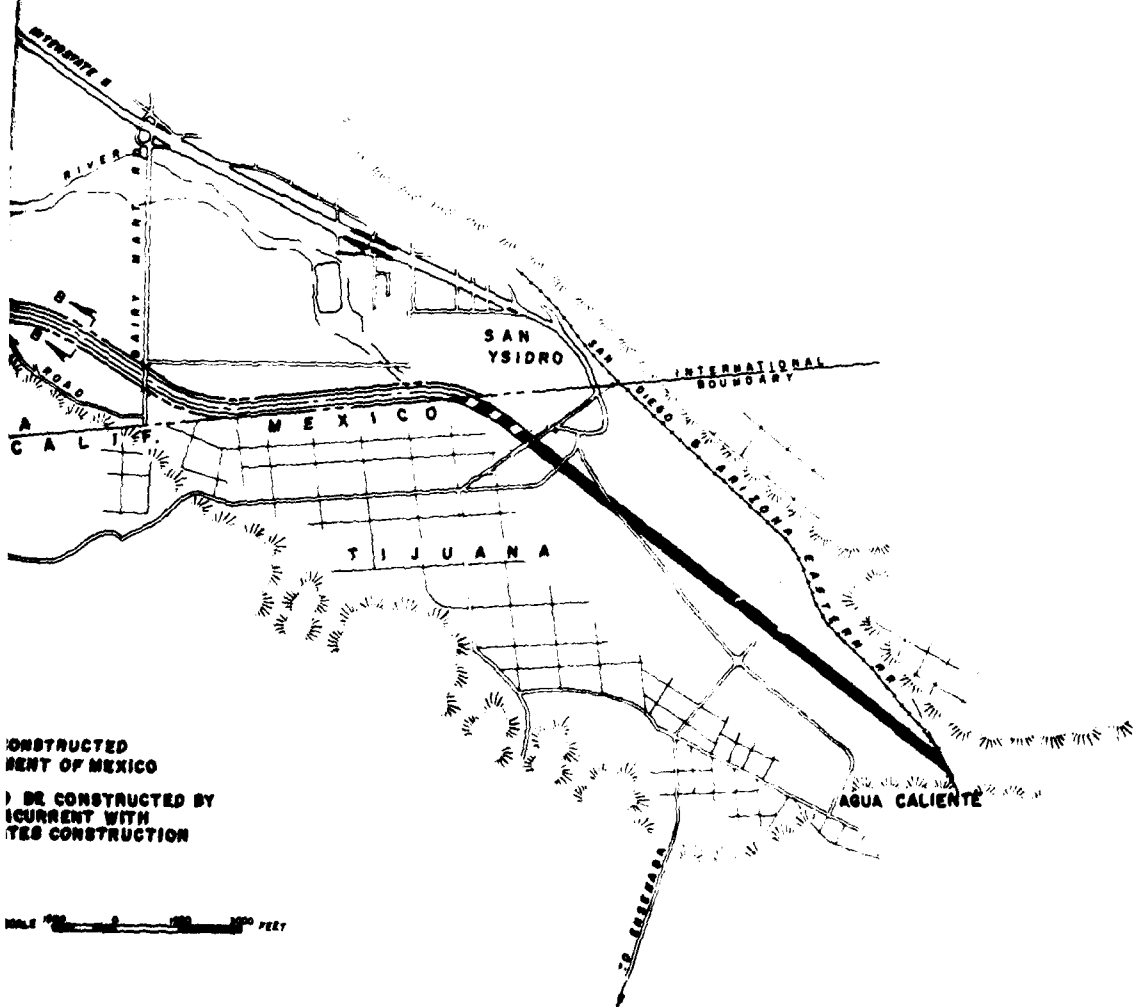




TYPICAL SECTION A-A
NOT TO SCALE



TYPICAL SECTION B-B
NOT TO SCALE



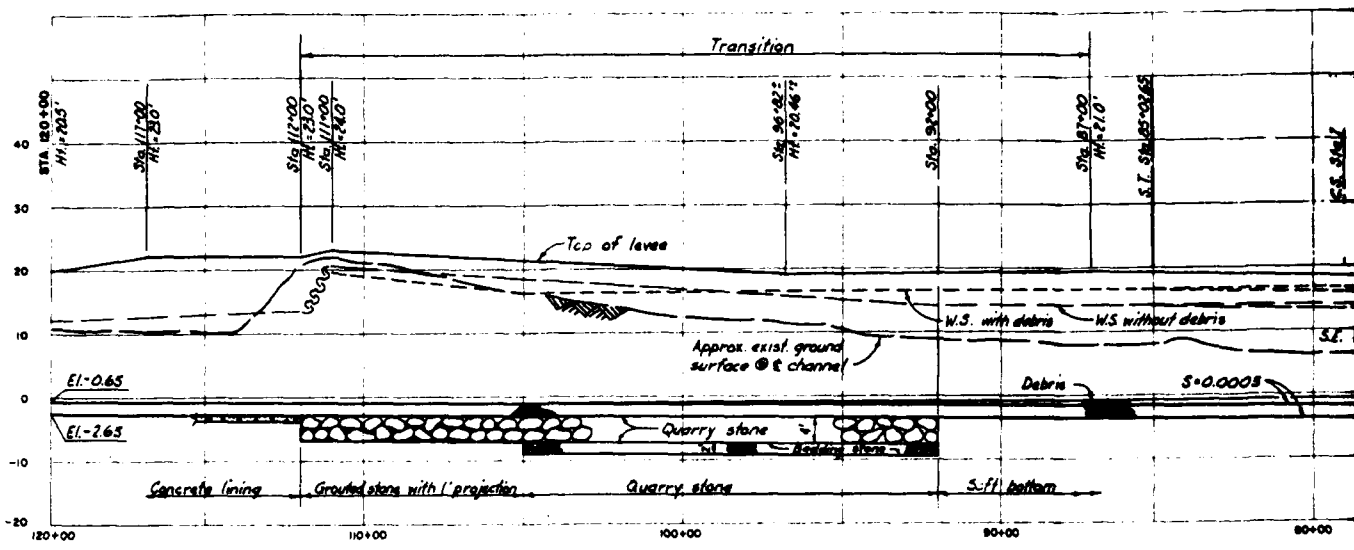
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SCALE 0 100 200 FEET

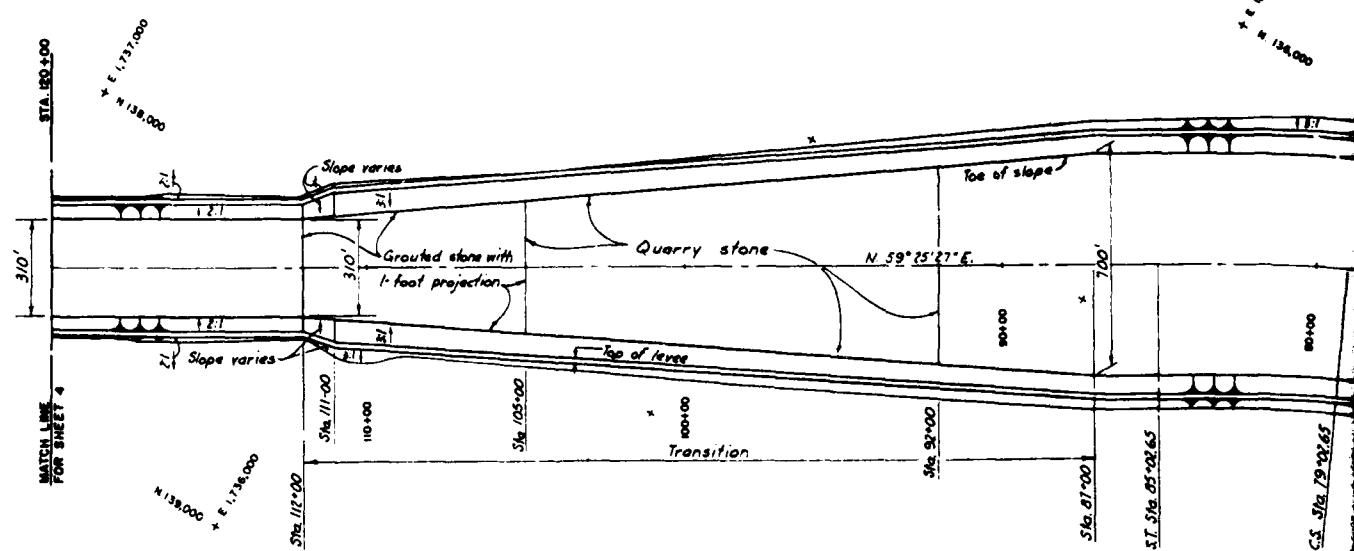
INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TIJUANA RIVER FLOOD CONTROL PROJECT

FULL CHANNELIZATION
ALTERNATIVE

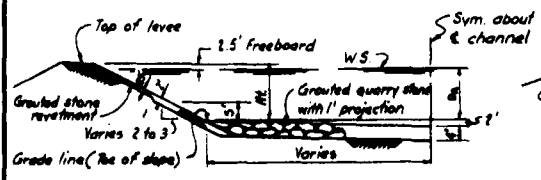
PLAN A



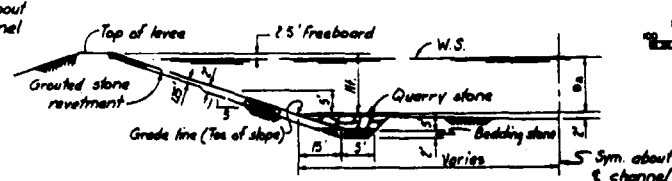
PROFILE
 HORIZ. 1 IN. = 20.0 FT
 VERT. 1 IN. = 10 FT
 Scales: 1:200 HORIZ., 1:100 VERT.



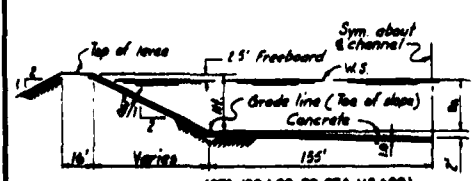
PLAN
 SCALE 1 IN. = 200 FT



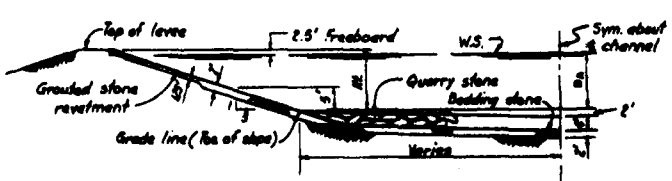
(STA. 112+00 TO STA. 108+00)



(STA. 92+00 TO STA. 88+00)



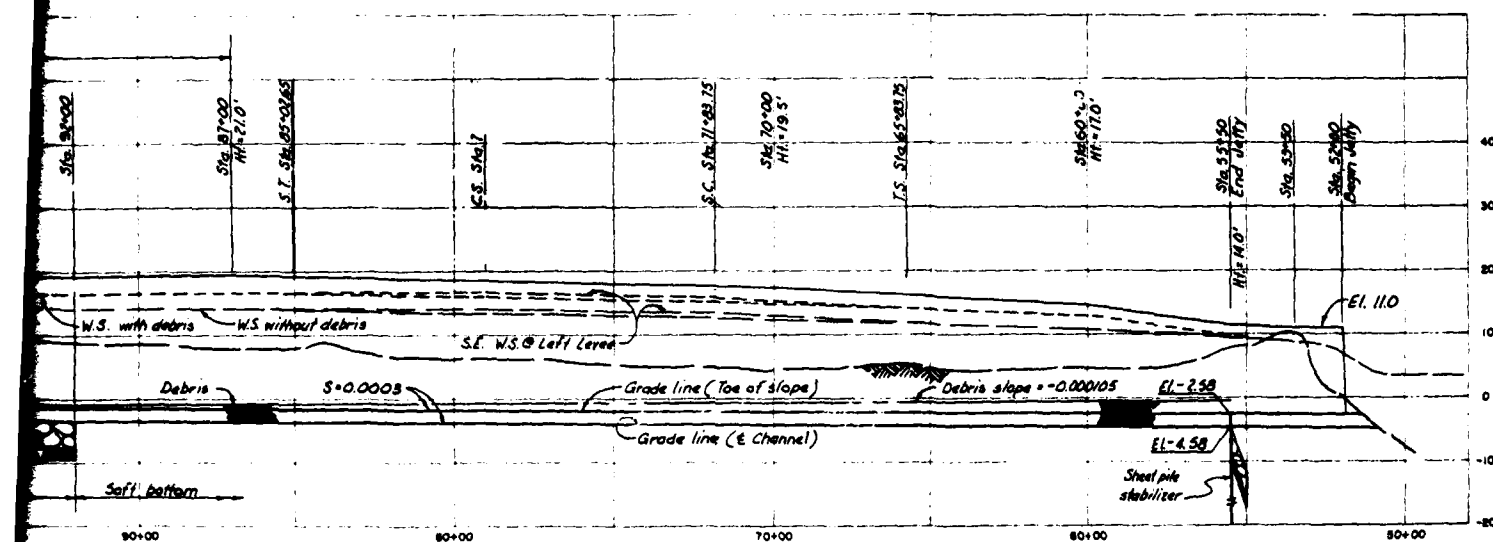
(STA. 120+00 TO STA. 112+00)



(STA. 108+00 TO STA. 92+00)

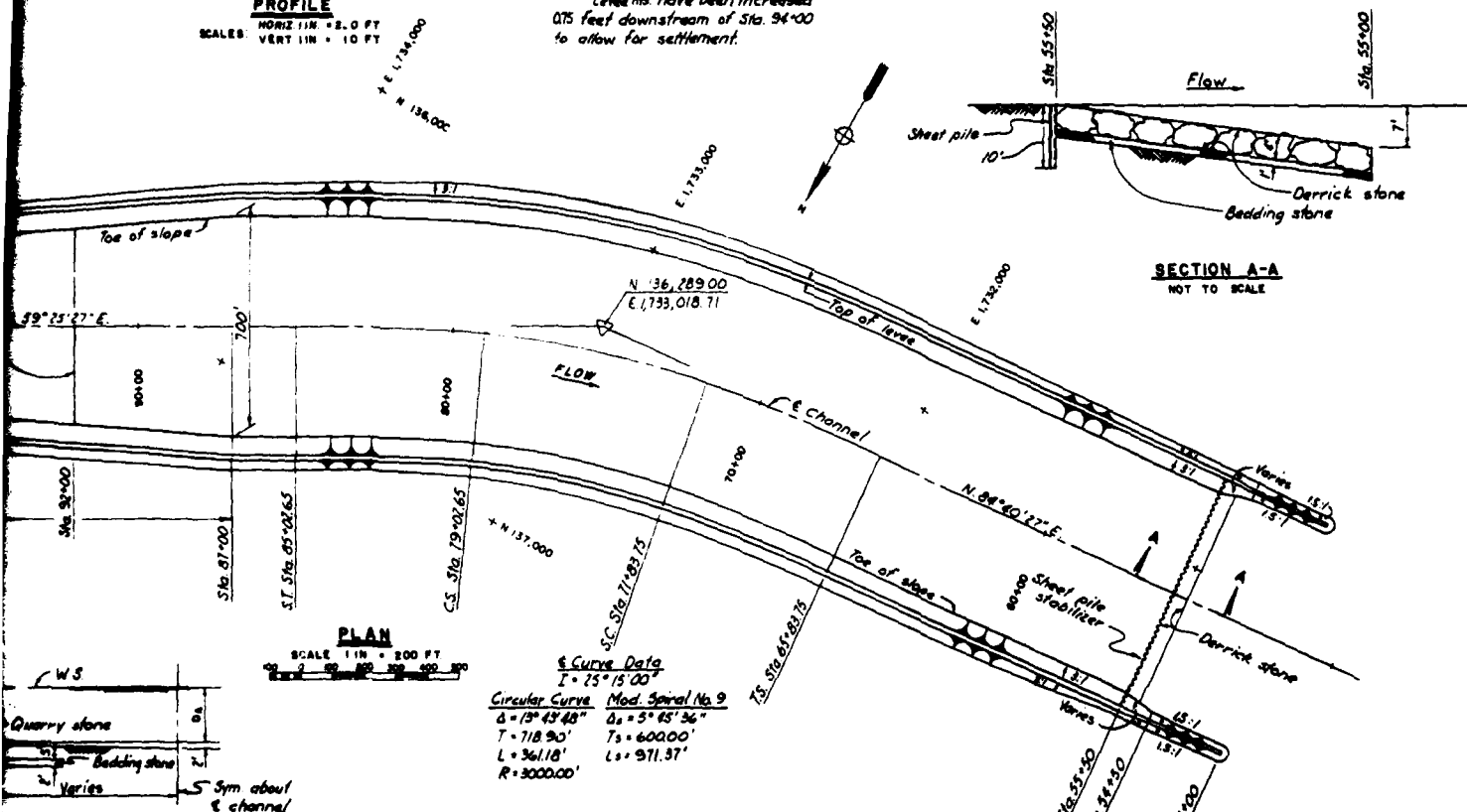
TYPICAL SECTIONS
 NOT TO SCALE

STATION TO	STATION
120+00	112+00
112+00	110+00
110+00	108+00
108+00	106+00
106+00	104+00
104+00	102+00
102+00	100+00
100+00	98+00
98+00	96+00
96+00	94+00
94+00	92+00
92+00	90+00
90+00	88+00
88+00	86+00
86+00	84+00
84+00	82+00
82+00	80+00



PROFILE
HORIZ 1 IN = 2.0 FT
VERT 1 IN = 10 FT

Note:
Levee Hts. have been increased
0.75 feet downstream of Sta. 94+00
to allow for settlement.



PLAN
SCALE 1 IN = 200 FT

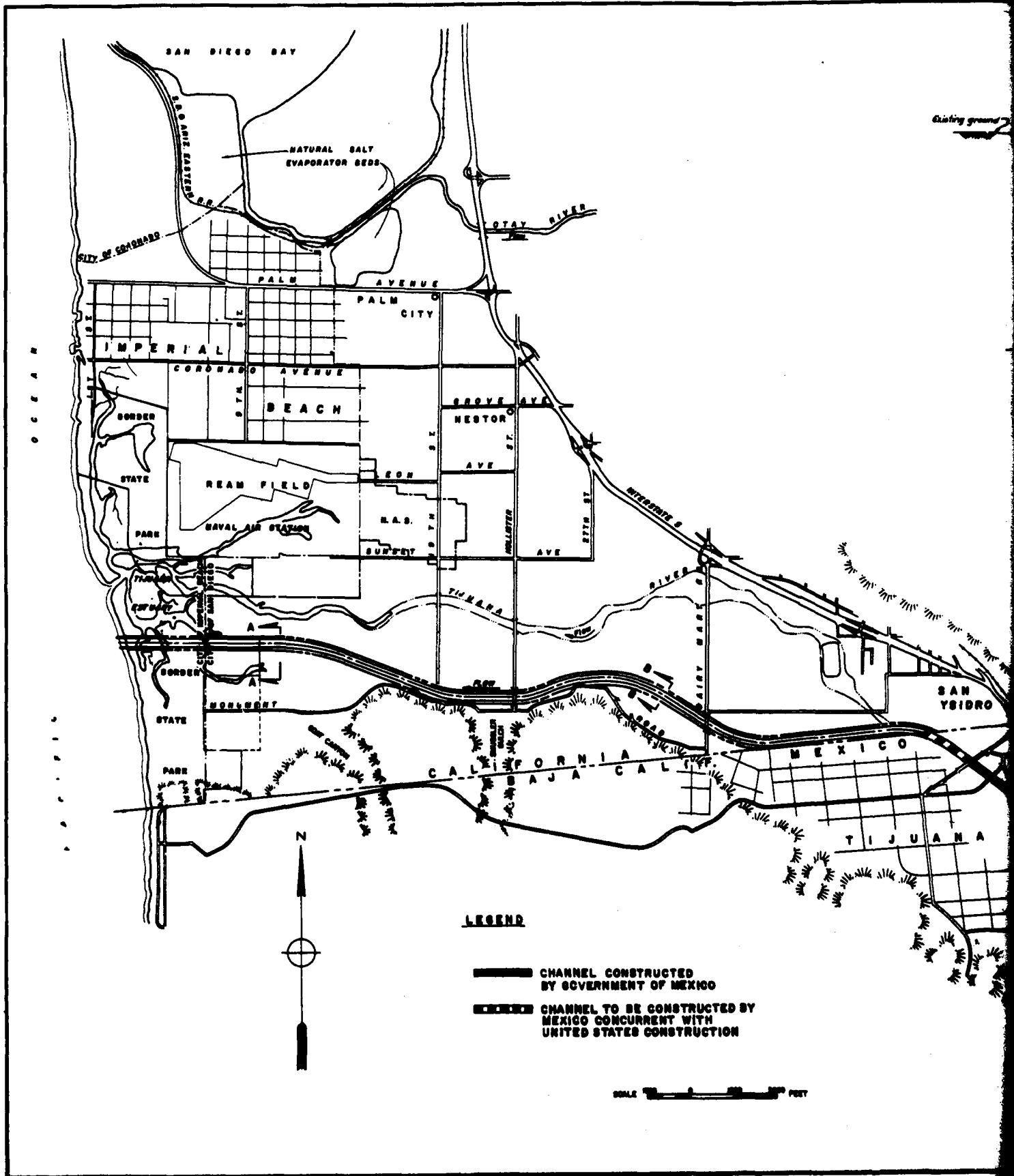
E Curve Data
I = 75° 15' 00"
Circular Curve Mod. Spiral No. 9
 $\Delta = 13^\circ 43' 48''$ $\Delta_s = 5^\circ 45' 36''$
T = 718.90' T_s = 600.00'
L = 361.18' L_s = 971.37'
R = 3000.00'

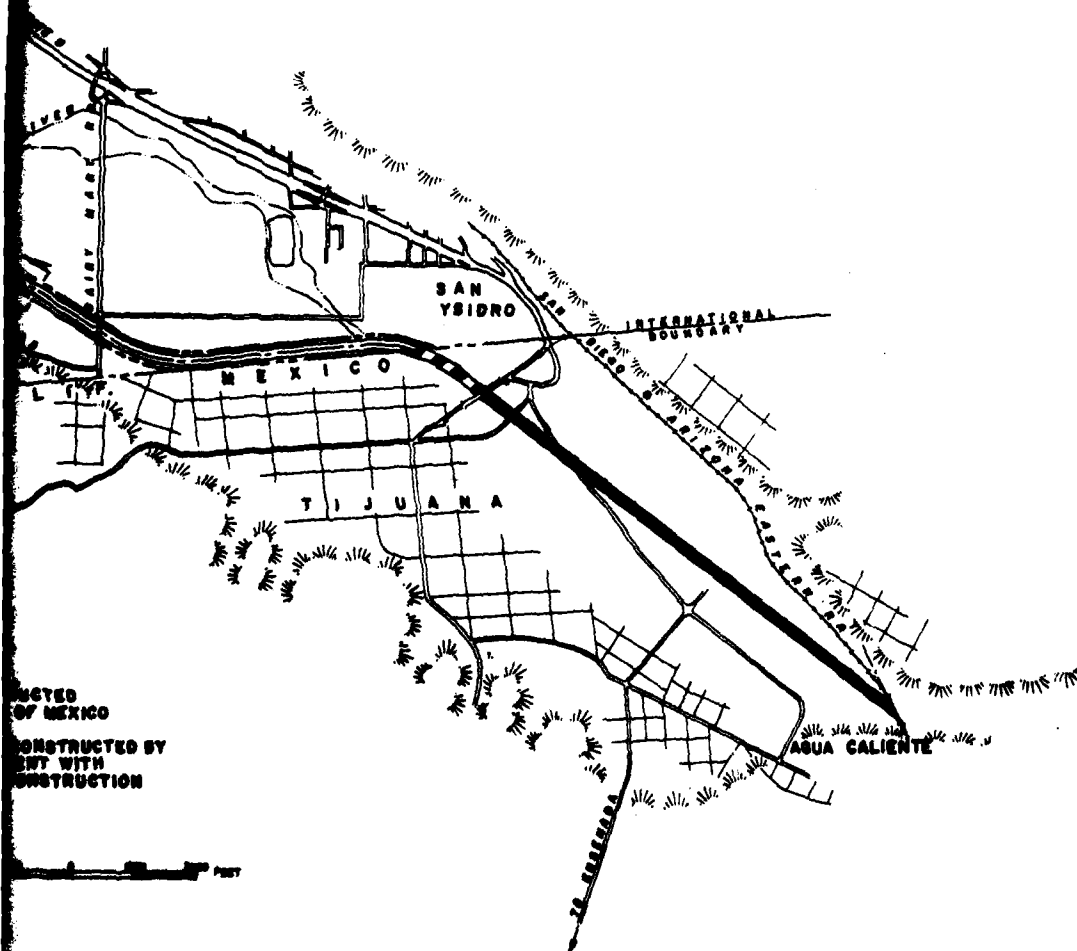
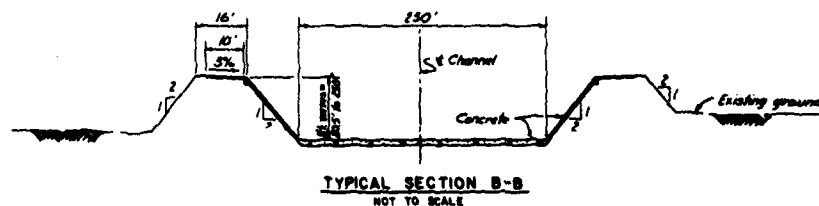
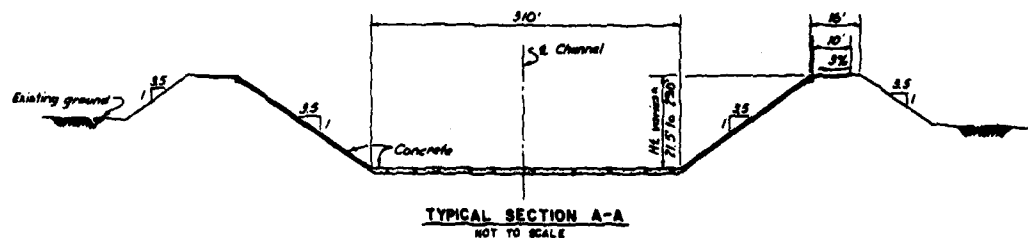
HYDRAULIC ELEMENTS									
STATION TO STATION	SECTION	SLOPE	Q	Q _s	n	WATER	VOL	VELOCITY	POWER
120+00	112+00	340' Top	0.0030	133,000	11.4	12.69	14.27	32.2	28.2
					n=0.045				
112+00	111+00	Transition	"	"	Varies	14.27	21.46	31.4	17.6
111+00	105+00	"	"	"	"	21.46	19.8	17.6	15.4
					n=0.025				
105+00	92+00	"	"	"	"	17.2	17.7	15.4	14.5
					n=0.025				
92+00	87+00	"	"	"	"	17.7	11.6	14.5	12.3
87+00	33+50	100' Top	"	"	10.3	12.6	10.3	12.3	11.9

DATA IS MEAN SEA LEVEL
INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TAMPA RIVER FLOOD CONTROL PROJECT

FULL CHANNELIZATION
ALTERNATIVE

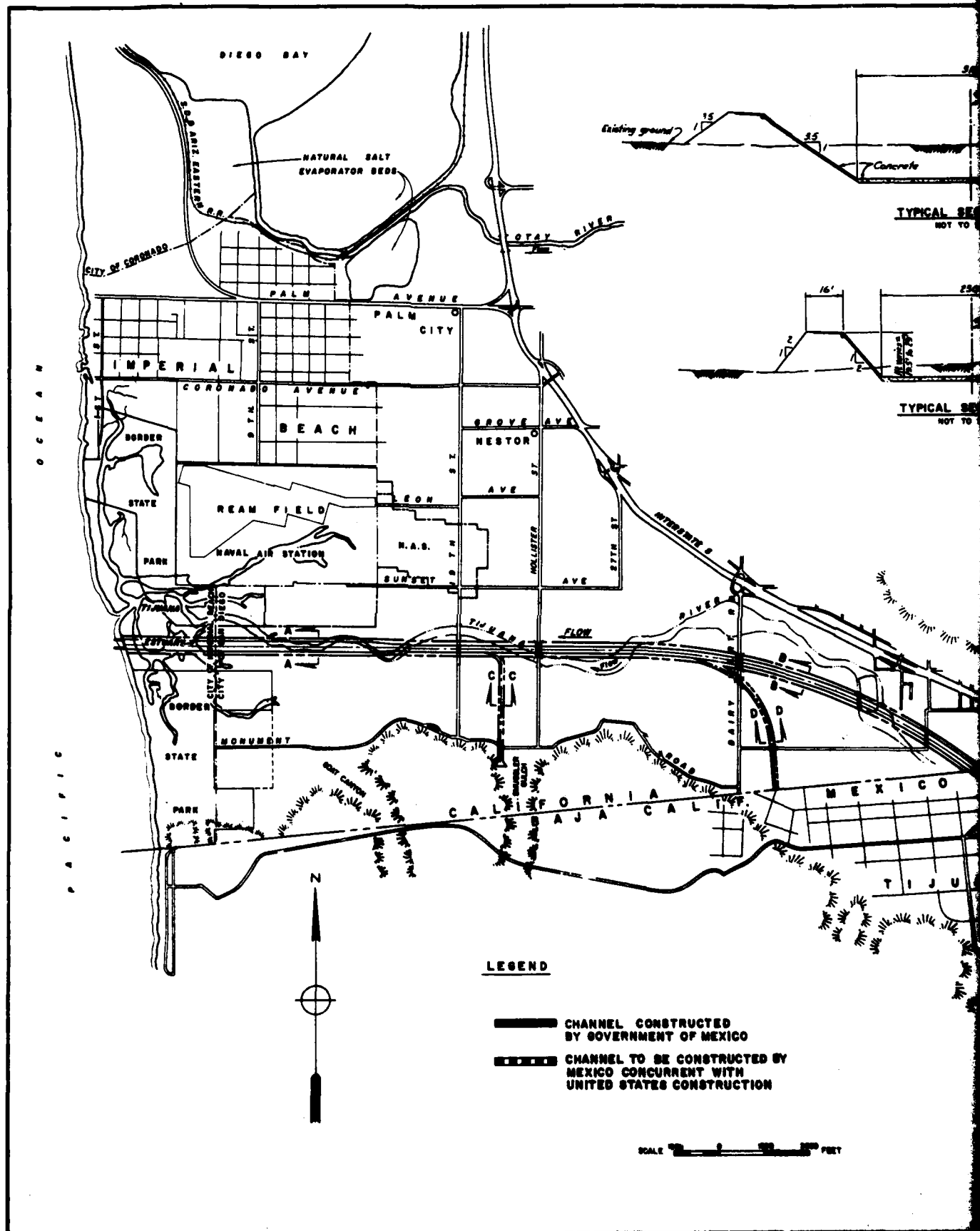
PLAN A-1

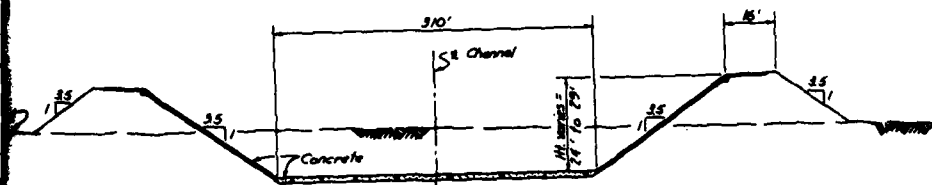




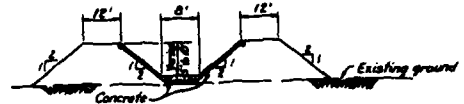
INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TIJUANA RIVER FLOOD CONTROL PROJECT
FULL CHANNELIZATION
ALTERNATIVE

PLAN B

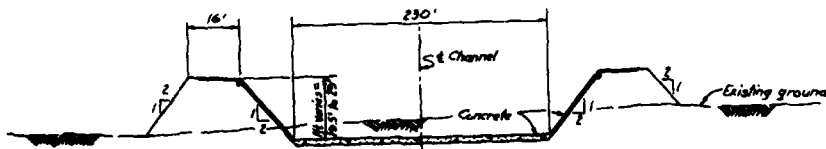




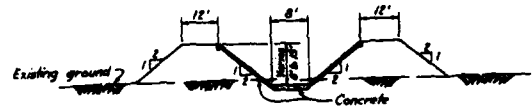
TYPICAL SECTION A-A
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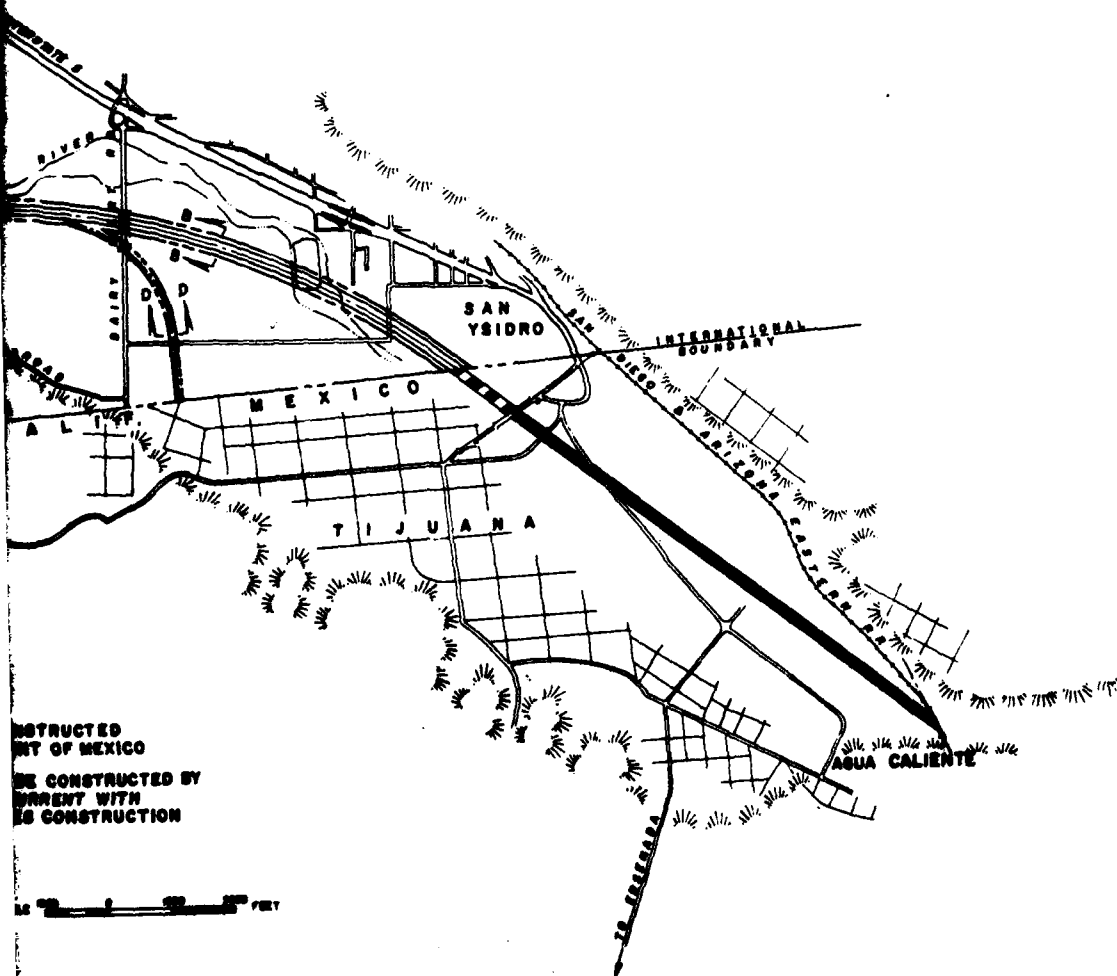
TYPICAL SECTION C-C
NOT TO SCALE



TYPICAL SECTION B-B
NOT TO SCALE

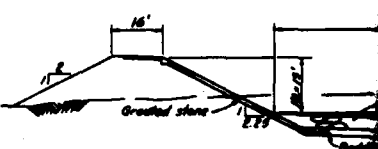
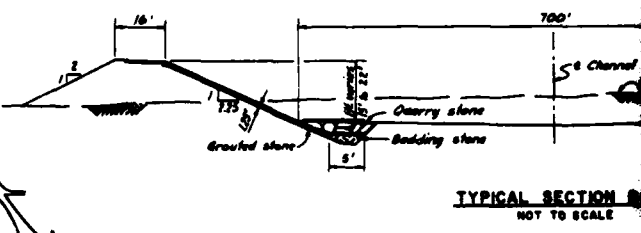
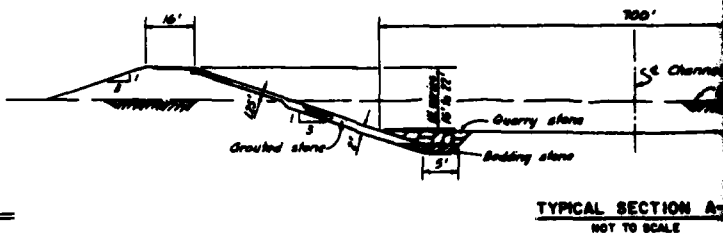
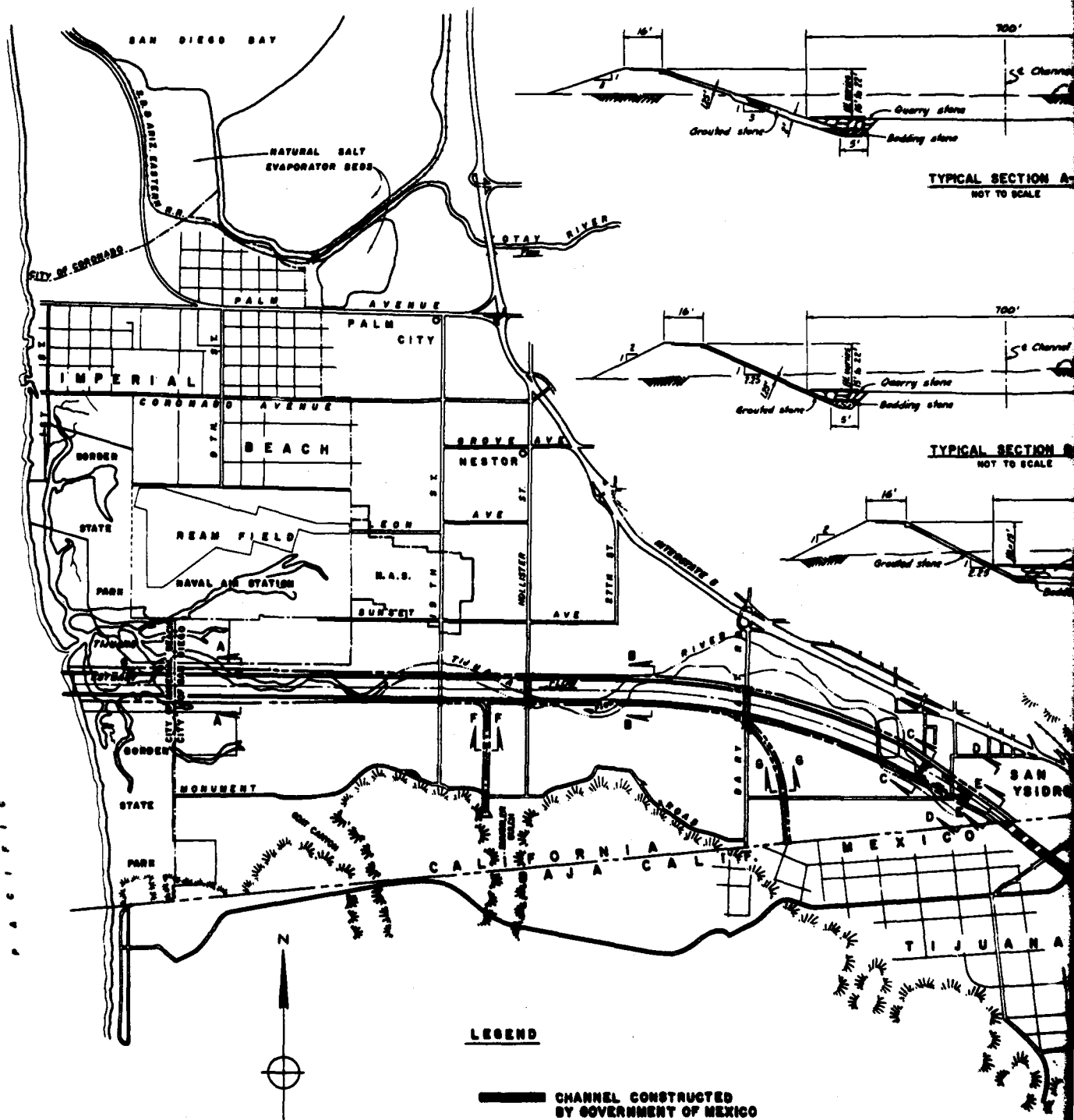


TYPICAL SECTION D-D
NOT TO SCALE

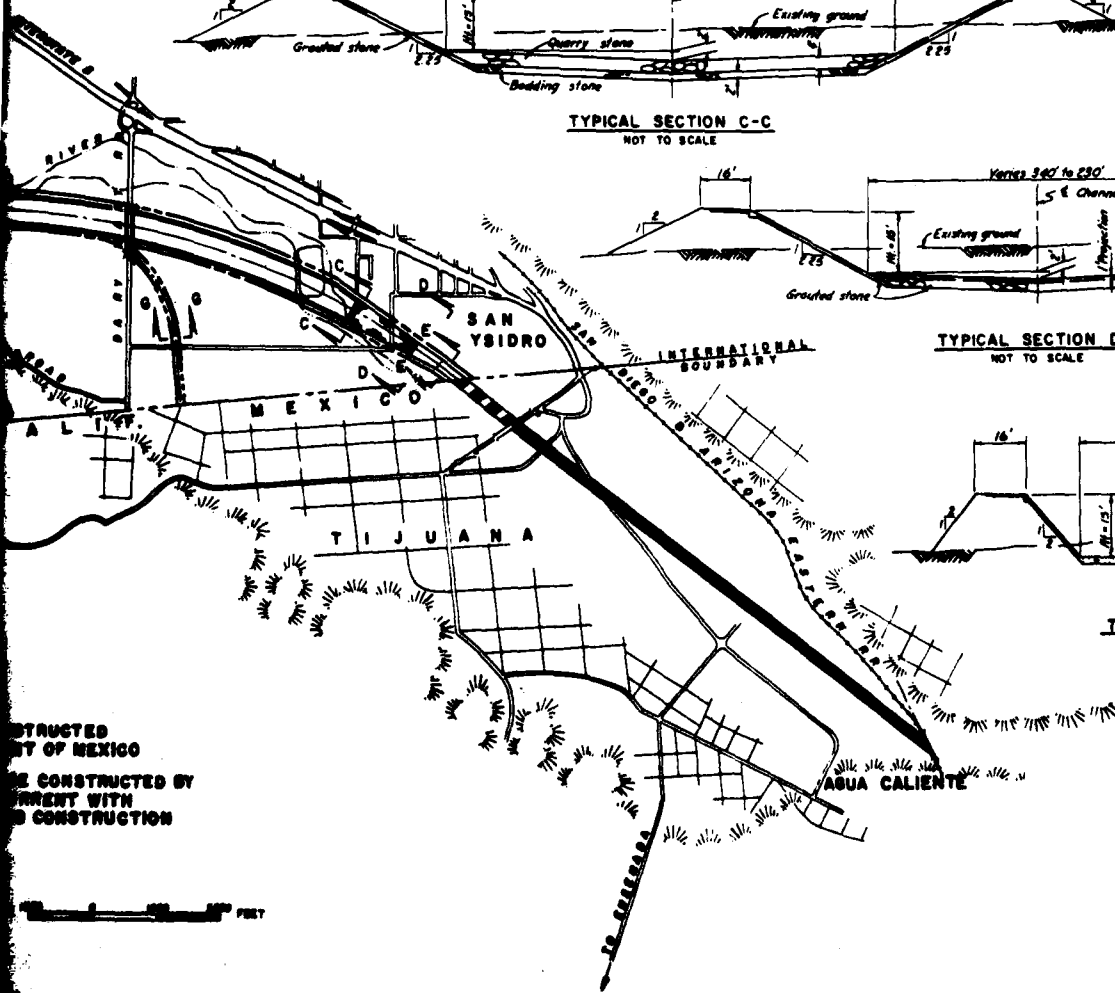
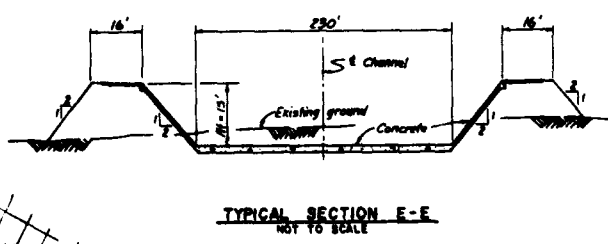
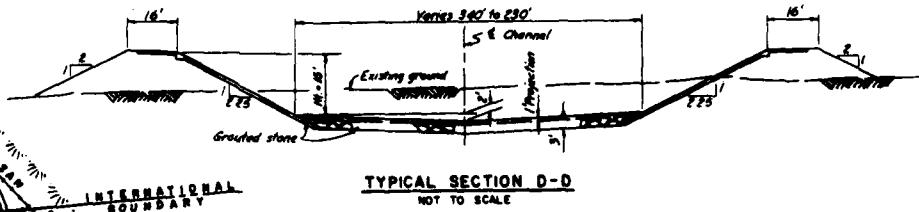
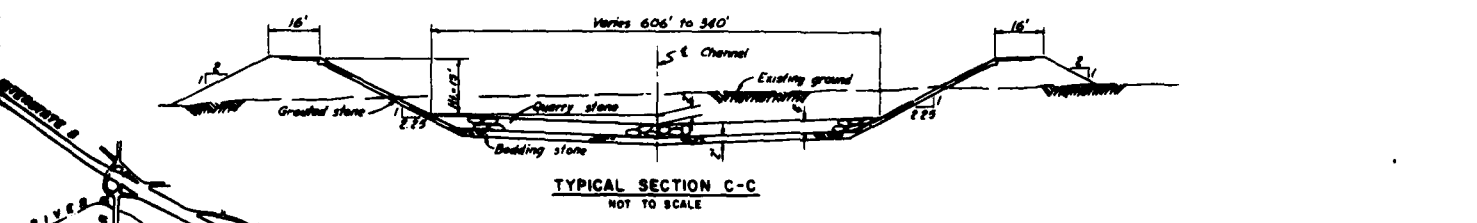
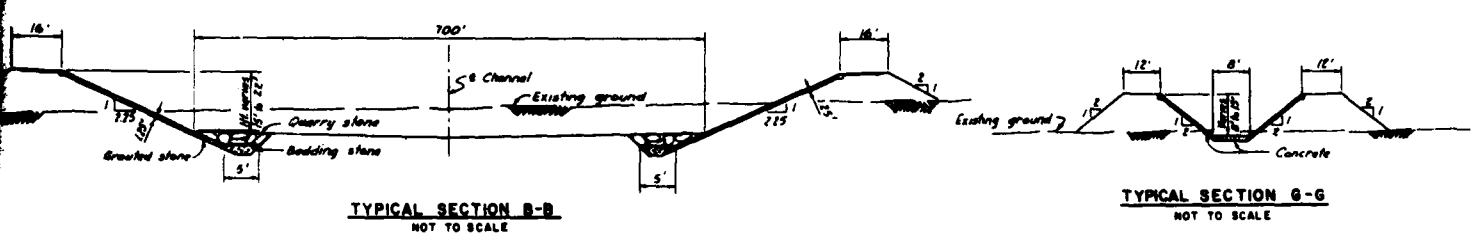
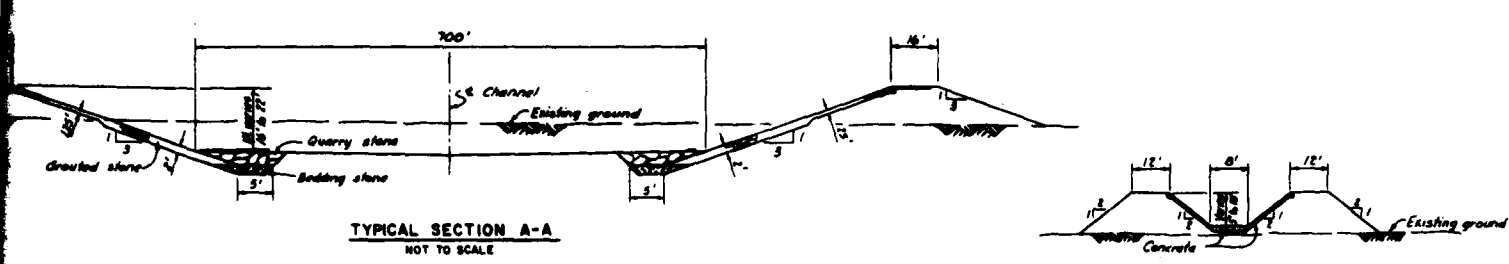


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CURRENT WITH
IS CONSTRUCTION

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TIJUANA RIVER FLOOD CONTROL PROJECT
FULL CHANNELIZATION
ALTERNATIVE
PLAN C



SCALE 1" = 100' FEET



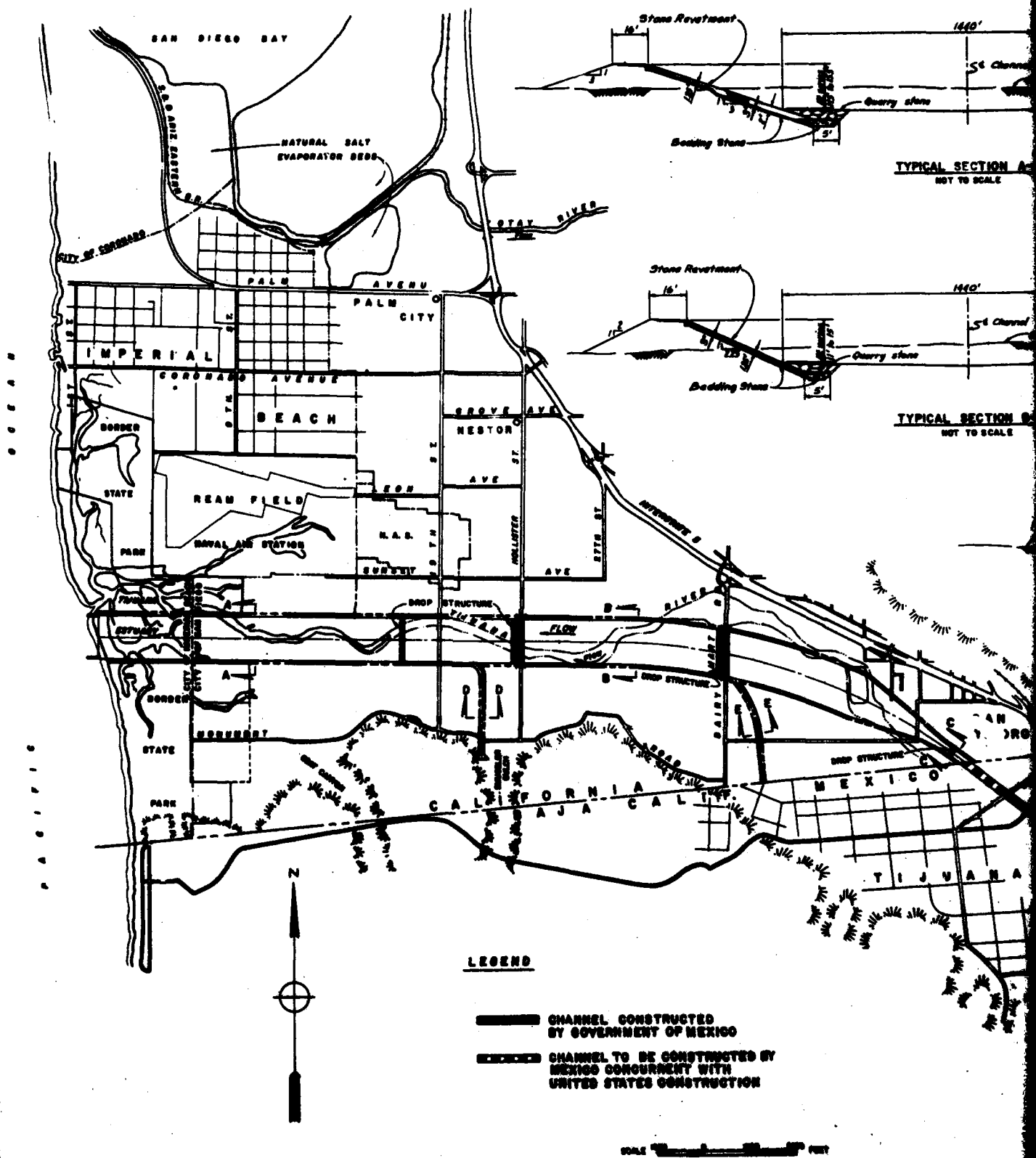
CONSTRUCTED
BY THE STATE OF MEXICO
AND THE UNITED STATES
ARE CONSTRUCTED BY
THE UNITED STATES
IN CONSTRUCTION

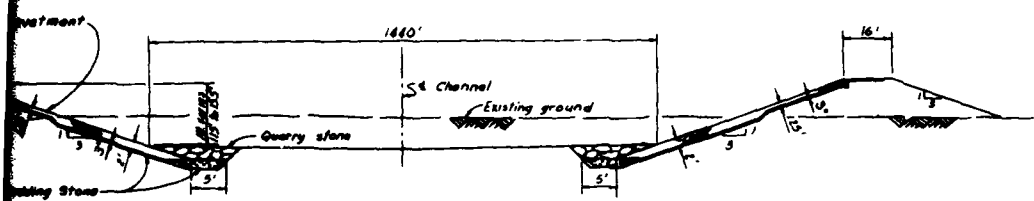


INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TIJUANA RIVER FLOOD CONTROL PROJECT
**FULL CHANNELIZATION
ALTERNATIVE**
PLAN D

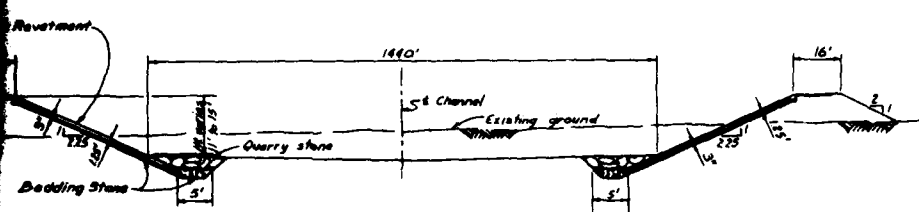
2

PLATE

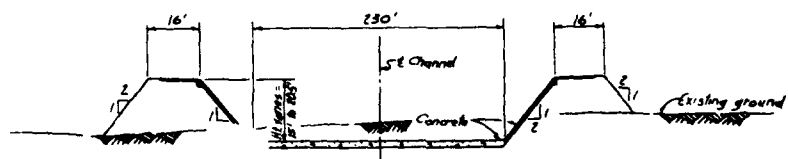




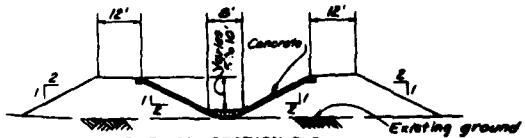
TYPICAL SECTION A-A
NOT TO SCALE



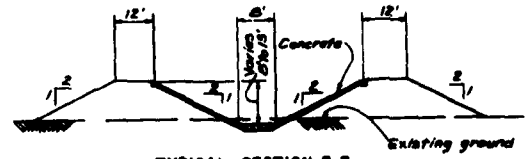
TYPICAL SECTION B-B
NOT TO SCALE



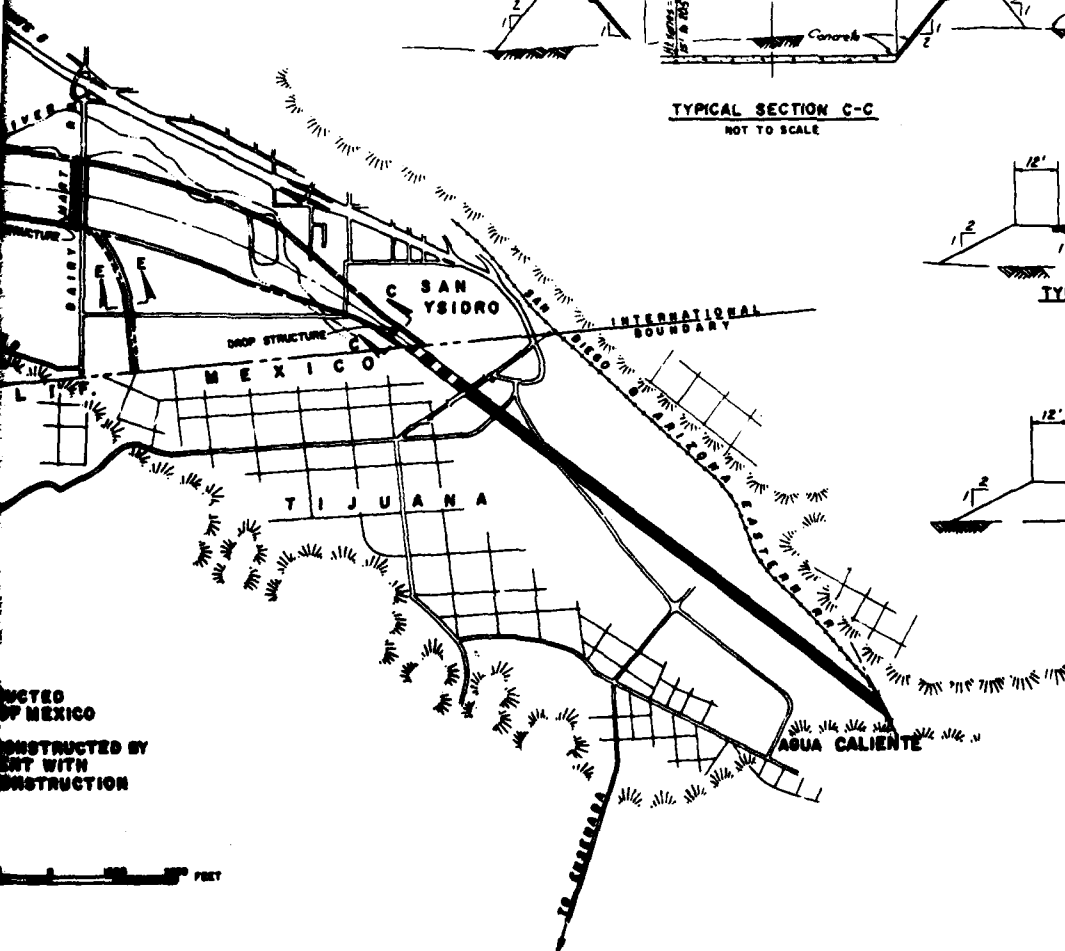
TYPICAL SECTION C-C
NOT TO SCALE



TYPICAL SECTION D-D
NOT TO SCALE



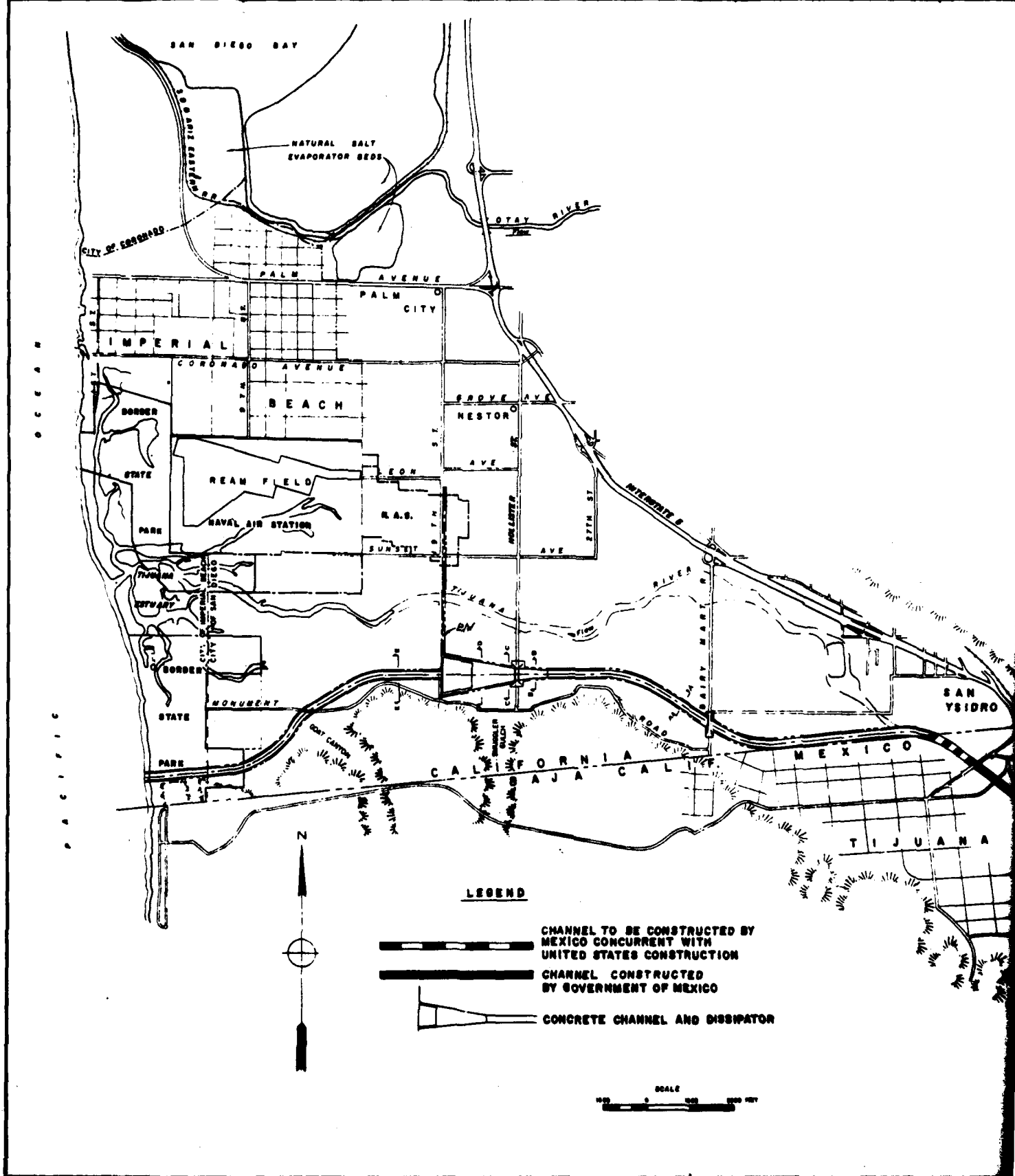
TYPICAL SECTION E-E
NOT TO SCALE

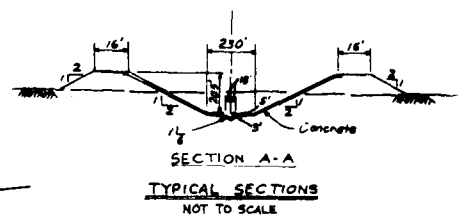
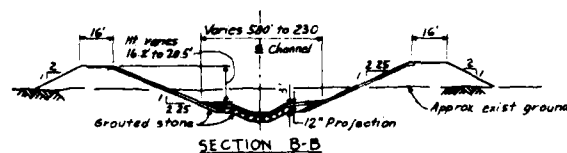
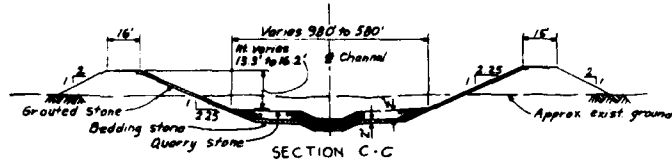
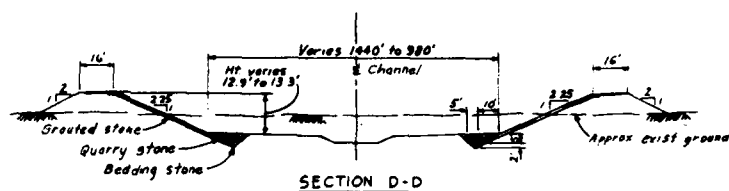
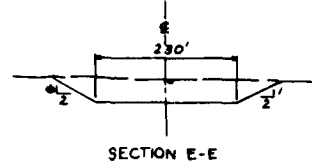
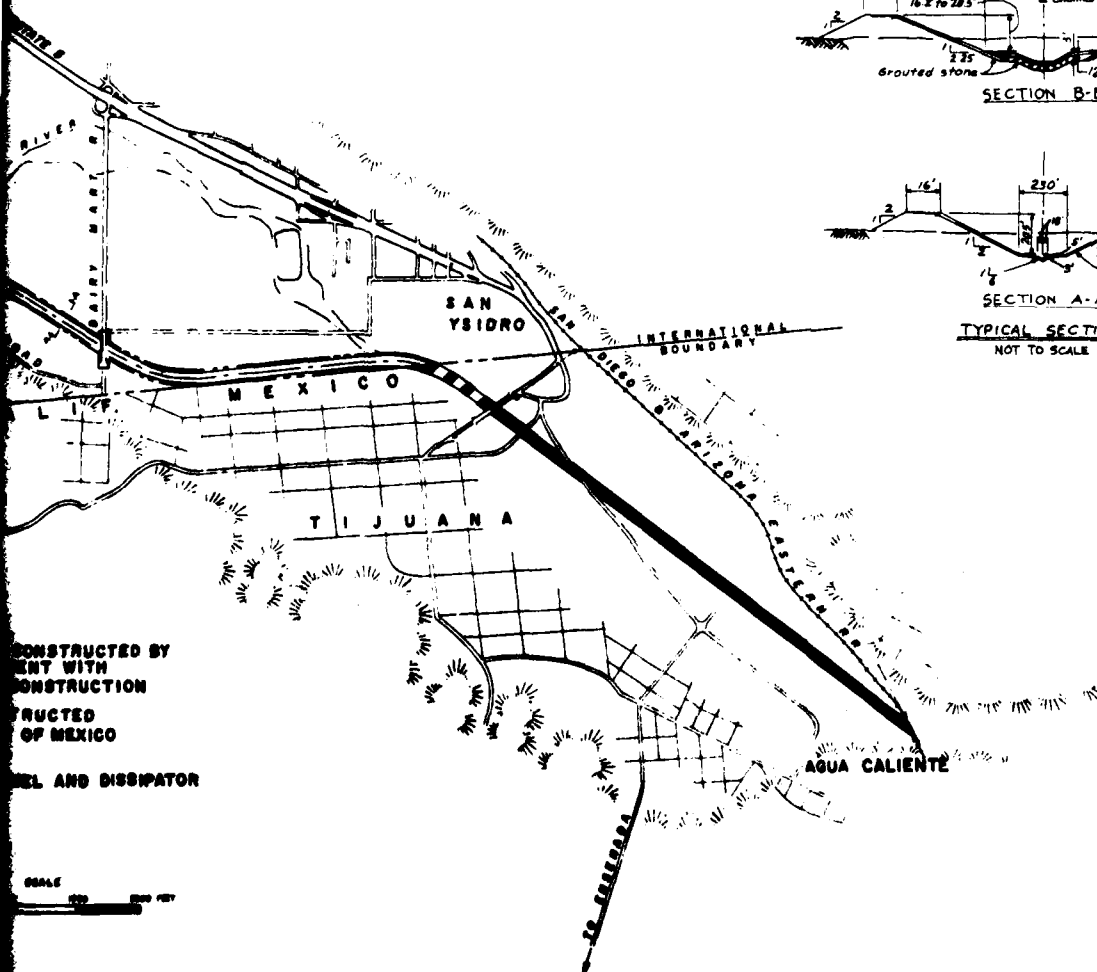


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INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TIJUANA RIVER FLOOD CONTROL PROJECT
FULL CHANNELIZATION
ALTERNATIVE

PLAN E

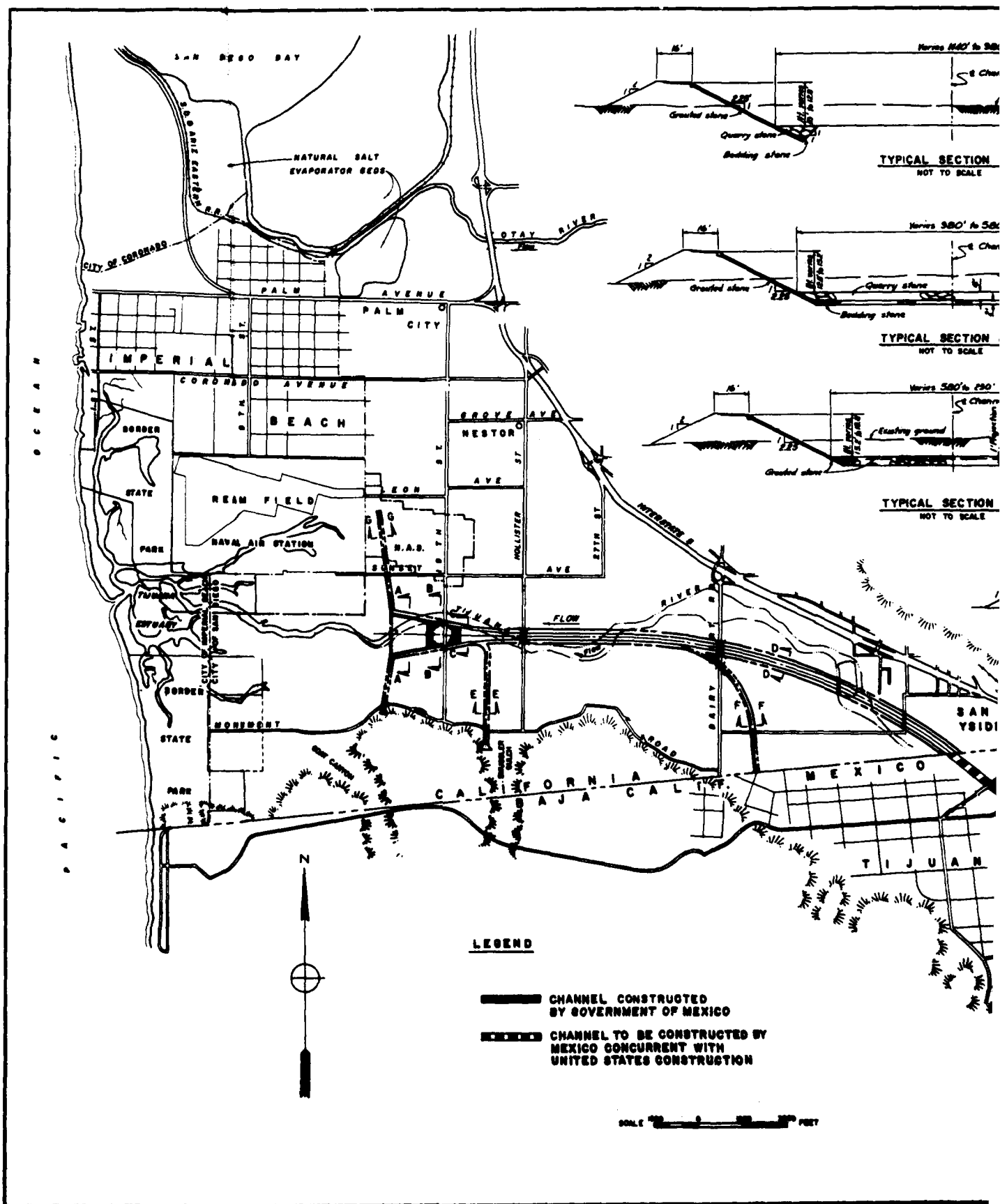


TYPICAL SECTIONS
NOT TO SCALE

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
TIJUANA RIVER FLOOD CONTROL PROJECT

FULL CHANNELIZATION
ALTERNATIVE

PLAN H



AD-A136 675

TIJUANA RIVER FLOOD CONTROL PROJECT SAN DIEGO COUNTY
CALIFORNIA(U) INTERNATIONAL BOUNDARY AND WATER

3/3

UNCLASSIFIED

COMMISSION EL PASO TX UNITED STATES SECTION 20 MAY 76
18WC-EIS-76-1 F/G 13/2

NL



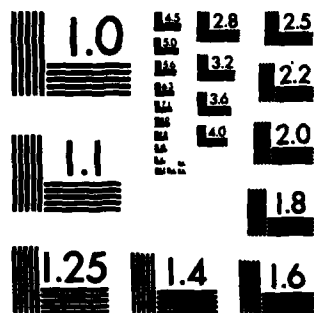
END

DATE

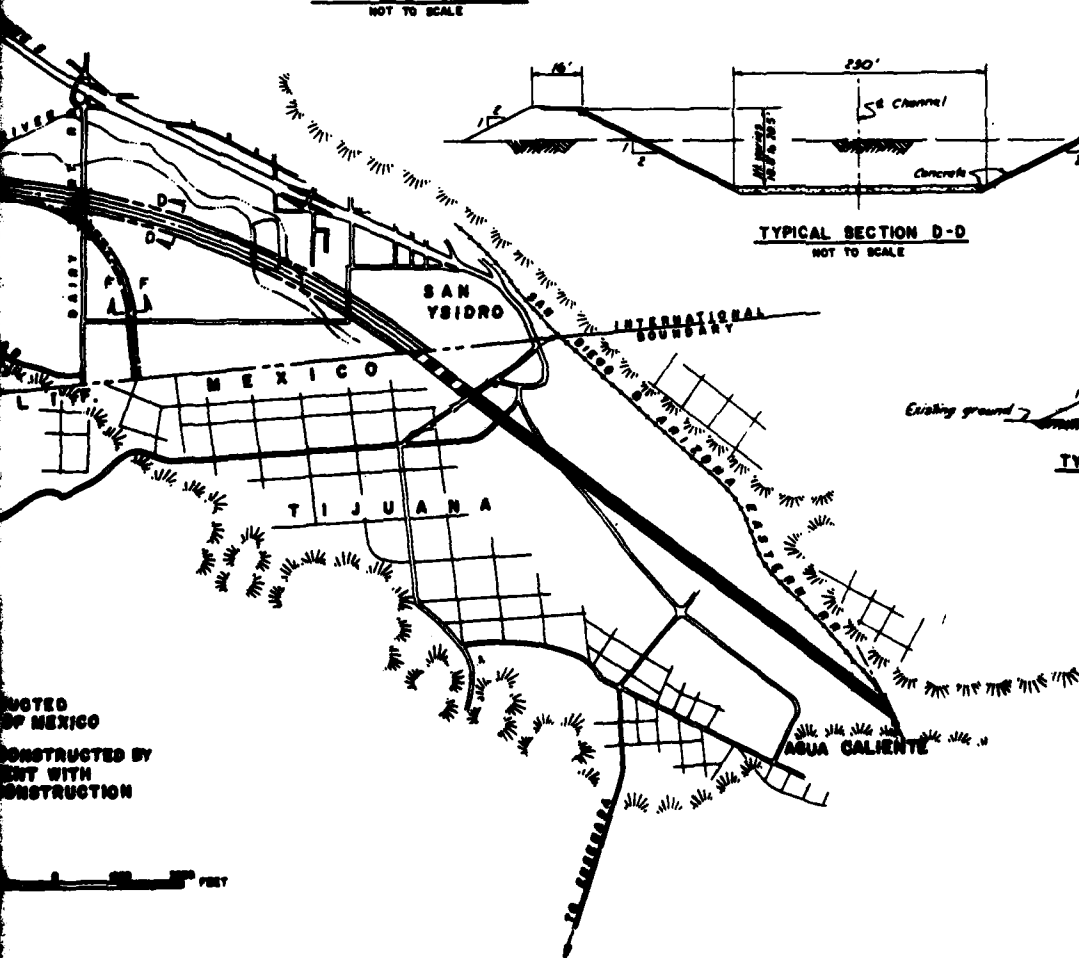
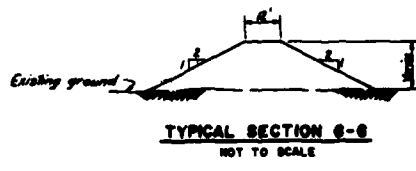
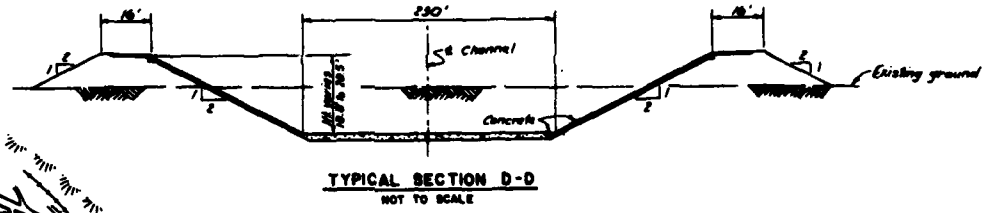
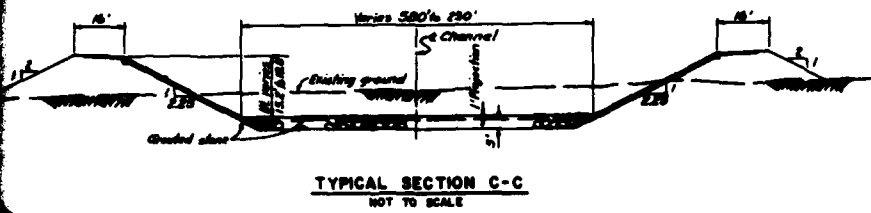
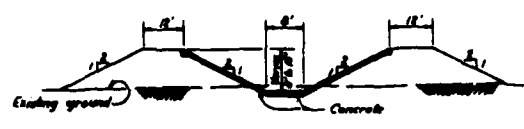
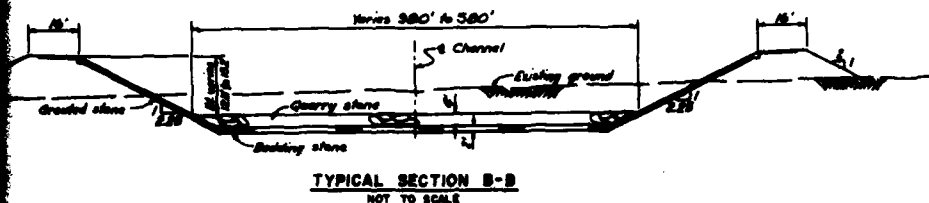
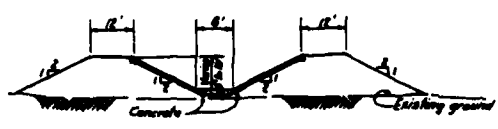
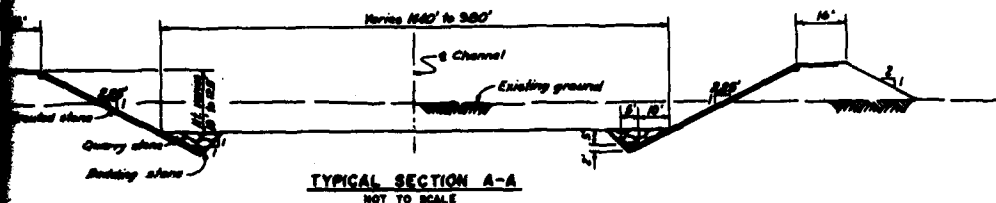
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



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CONSTRUCTION

INTERNATIONAL BOUNDARY AND WATER COMMISSION UNITED STATES AND MEXICO TIJUANA RIVER FLOOD CONTROL PROJECT
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PLAN F

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This environmental statement, covering a flood control project in the Tijuana River basin, San Diego County, California, was pre- pared in compliance with Public Law 91-190, National Environmental Policy Act of 1969. It presents detailed information on the environmental setting, the environmental impact of the proposed action and an evaluation of various plans for the Tijuana River flood control project.		